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EDUCATIONAL HYGIENE

Doors that insure safety in case of fire

Protection from fire is a first principle of educational hygiene

ESSENTIALS OF EDUCATIONAL HYGIENE

EDITED BY

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PREFACE

The remarkable movement for the improvement of school and community health in the last decade has brought the school into such close and intimate relationship with the health work of the home and the community that "*school* hygiene" is hardly broad enough as a term to include the various health aspects of the bringing up of children. On the other hand, the term "*child* hygiene" is too broad. The title "Educational Hygiene" has been adopted for the science and art of health preservation and promotion which the school can more or less directly promote through its various health agencies. When the school nurse visits the homes and improves the health of the children below school age as well as that of the pupils of the school, and when school physicians provide for consultation hours for mothers, whether patrons or not, the old-time school hygiene is broadening out into educational hygiene. This movement has but begun, and will inevitably continue to expand.

Educational hygiene, furthermore, is desirable as a term, since the subject is now taking its place in professional schools for the training of teachers as correlative with educational psychology, educational sociology, educational philosophy, educational history, educational administration, and the like. As educational administration was once termed *school* administration, so educational hygiene was once termed school hygiene, and the desirability of the change in college courses is probably not less for the latter than for the former.

This comparatively new science is broad in scope, covering as it does the five divisions: medical supervision, physical education, school sanitation, the teaching of hygiene, and the hygiene of instruction. Obviously, very few persons can

make any just claims to being experts in this entire field, and exceedingly few persons have had very much practical and scientific experience in all of them.

This volume is an attempt to bring together in organized form the latest information and advice of leading specialists in all the large phases of the subject. The hygiene of children from the standpoint of the school in its relationship to the home and community, from the pre-school period up to the college, is sketched in such detail as is possible in so comprehensive a volume. There has been a constant temptation to add chapters on many new phases of the school-health movement, but the editor has tried to limit himself to certain "minimum essentials," and to give references to the voluminous literature which treats at length the many topics discussed here only briefly. Each chapter and parts of many chapters easily furnish topics for much-needed books, some of which have already been provided by contributors to the volume. Effort has been made to lead the reader on from these condensed statements to the monographic literature.

The school as a public agency ministering to the dominant needs of the community in the interests of the state is always kept in mind. Each contributor has attempted to show how the public educational agencies may improve their assistance to the solution of the grave problems of national health and vitality. Several chapters are comparatively unique in this respect, such, for example, as those on public co-operation for school-health progress. These give a point of view much needed by the many educators who have neglected educational sociology in their professional studies. A chapter on the health of the teacher was planned, but omitted because the matter, though of great importance, has received little scientific study, and because each teacher should have access to the little book published on this subject by Professor Terman.

To the many persons who have so kindly lent their assist-

ance in contributing to the volume, to his wife, to those who have furnished photographs from many parts of the world, and to the publishers for their cheerful co-operation, the editor is sincerely grateful.

L. W. R.

WASHINGTON, D. C.

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EDUCATIONAL HYGIENE

PART I

HEALTH SOCIOLOGY

CHAPTER I

PUBLIC HEALTH AND THE PUBLIC SCHOOLS

The Public-Health Problem.—In a recent volume Price Collier has asserted that "the earth will be as cold as the moon before all men realize that the only real wealth is health";[1] and certainly the experiences of the past seem to warrant his conclusion. Health is and will always remain a fundamental value of life, practically inseparable from life itself. Yet on every side, the world over, we are confronted by the fact that health, including normal physical development, longevity, and splendid bodily resistance, is being only very inadequately achieved by millions of people. When a third of all the children born with such cost into a civilized community like America die before the age of five, when the draft disclosed that more than one-third of the flower of America's manhood was physically unfit for military service, when the average term of life of our people is some twenty years shorter than it should be, and when illness, deformities, and multifarious physical defects are afflicting the race with an immense and overburdening cost, it would seem that every agency which the state has at its disposal would be vigorously engaged in preventing and eliminating from the world, or lessening to a fraction of their present destructiveness, these enemies of health and vitality.

[1] "Germany and the Germans" (Scribners).

Instead of such universal and united resistance to a common foe, what do we find? In the first place, we find a great private medical profession that lives by the diagnosis and cure of existing ailments, but not primarily by their prevention and final elimination from the world. Outside of China disease has long been the friend, not the enemy, of physicians, for it has been disease that has brought to them their livelihood. To slay the food-bringer has not been the policy of the past, and it is one of the greatest glories of the present that an increasing number of physicians are becoming willing to make such sacrifice. Unfortunately, the social situation has demanded the wrong thing. It should be made the physician's chief mission and means of livelihood to banish from the earth the enemies of health and physical perfection.

This utopian condition is, indeed, coming swiftly upon us in the very rapid increase of public agencies manned by doctors and nurses in great numbers. Such public hygienists as Winslow prophesy, indeed, the complete or almost complete socialization of health service in the next few decades.[1] Great insurance societies are finding it to their advantage to keep their policy-holders well by periodical examinations, health instruction, nipping incipient ailments, and by sending visiting nurses to those who need their help. Our governmental health service, in the form of local, State, and national health departments or bureaus, has a far greater motive for disease prevention, but it is in general, though with many brilliant exceptions, exceedingly inadequate and inefficient. These bureaus, however, are everywhere so increasing their staffs that preventive medicine is really making fairly rapid progress. Many agencies, more or less efficient, are steadily tending to make the work of the old-time curative-medicine doctor less necessary, and in many places the clash between the factors

[1] "Efficiency in the Public-Health Campaign," in the *North American Review*, June, 1913. A free bulletin of the New York State Board of Health, Albany.

for eliminating the causes of disease and for treating disease after it has come into being is not as mild as, to the outsider, it may appear. The inevitable movement will be to push the curative doctor over into the field that for the time being cannot, by the best efforts, both public and private, be conquered by preventive measures, including hygiene, sanitation, physical development, etc.

Because of the comparative lack of development of preventive medicine and public-health agencies, we see, in the second place, more clearly than ever before, a great host of only partially utilized agencies for reducing or eliminating our disgraceful and enormous death, illness, and physical-defects losses. Fundamentally, of course, the elimination of unnecessary ill health depends upon the two factors of nature and nurture, of eugenics and hygiene. Doctor Davenport shows briefly in a later chapter the considerable and largely unguessed-at influence of heredity upon the amount of disease and physical defects among human beings. Ideally, of course, we should all be the offspring of physically and mentally perfect parents. This would be our greatest insurance for the possession of like characteristics. To help in some measure to bring about such a happy state, to eliminate many of our most terrible losses in the way of feeble-mindedness and gross physical imperfections that are inheritable, and to give sound biological advice to the hygienist working with environment, in order that he may prevent the bringing out of native weaknesses—these are the objects of many eugenic agencies now springing rapidly into being.

Public-Health Agencies.—Certain factors in heredity are, then, of utmost importance to the hygienist, but his chief work falls in the field of nurture, of environmental control.[1] It is the duty of the state to insure, within reasonable limits, that its children and future citizens be well born; but the duty which is far clearer and simpler at present is that of providing such environmental control of the population, young

[1] See Winslow, "Man and the Microbe," *Popular Science Monthly*, July, 1914.

and old, that disease, premature death, and physical defects may be reduced to a minimum. The public agencies for such health-control may be briefly and tentatively classified as follows:

1. Medical or health supervision of the population.
2. Securing in all ways a sanitary environment.
3. Medical or health research.
4. Educational control of the population.

Since this is a free country, where very much depends upon the choice of the people, the last-mentioned means, educational control of the population, far outweighs in importance all the others. Every agency of health amelioration soon discovers and heralds abroad that the progress of health measures depends absolutely and finally upon the education of the people, old and young. If laws for health improvement are to be enacted, they must have the support of an enlightened public both before and after they are passed; if health measures are to be practised they must through some form of educational effort be made habit. In short, the most fundamental means of health improvement is through education in the habits, knowledge, ideals, and the physical development which go with socially efficient right living, personal and public. Such education begins at birth and lasts throughout life. It can only be partially monopolized by the public educational, or schooling, system. And yet, since the educational system is extending its beneficent influence over those of pre-school and post-school age, and, moreover, since it influences individuals in their most plastic and formative period, that of childhood, the public school stands out easily as the greatest single instrument for health promotion possessed by the civilized world.

Educational Hygiene.—In its widest sense, then, educational hygiene is broader than the school, including, as it does, all agencies for the promotion of health measures through education. The boards of health, the newspapers and magazines, the public lecturers of the American Medical

Association, the leading insurance companies, the anti-tuberculosis and other societies, and many other agencies[1] are very largely engaged in the field of educational hygiene. In the narrower sense, as used in this volume, educational hygiene is the name given to all the phases of health promotion work which may be and are undertaken by schools, especially public schools, from kindergarten through college, for people of all ages, but especially for those between the ages of four and twenty-four.

We have for some time had the science of educational psychology, used especially in the training of teachers. We have also educational sociology, educational administration, educational history, etc., and it is high time that we have an educational hygiene. The exclusive emphasis upon educational psychology in the past has led to a lop-sided knowledge of the educational process and the nature of children. The pathological and physical child is at least as important from the state's point of view as is the ignorant and mental child. This volume attempts to treat of the health and physical well-being of the people, old and young, as it can be affected by public schools. The future extensions of the school in this direction are beyond prophecy.

That the school may directly affect the health and normal physical development of persons who do not at the time attend the school as pupils hardly needs demonstration, and will be plentifully illustrated in the following pages. When school physicians and nurses have consultation hours for mothers with babes in arms, when the nurses go day after day into the homes to help improve home hygiene, when the schools are used as social centres for the health education and recreation of the community, when there is health vocational guidance in and after the school period, when schools use newspapers and various civic organizations for the promotion of

[1] See Dresslar on "Public Health Teaching Agencies" and "Methods and Means of Health Teaching," in the 1912 and 1913 Reports of the U. S. Bureau of Education.

the health of the children and community, then we have an influence that is far broader than the old-time "school hygiene," an influence that may very appropriately go by the name of educational hygiene.

The various phases of this rapidly developing science we shall briefly sketch as *medical supervision, physical education, school sanitation, the teaching of hygiene,* and *the hygiene of methods of teaching and management.*

The National Health Problem.—Before we can say what the schools, through the development of educational hygiene, can do for the health and happiness of our nation, it is necessary for us to face the actual health problems of the people and nation. The principal problems of the people and nation set the principal problems for their public educational systems. If the educational systems of the country can be helped to concentrate their energies upon the really big problems of life instead of upon so many little or obsolete ones, their social efficiency can undoubtedly be marvellously increased.

The principal phases of the national health problem are shown in the number of preventable deaths, in the prevailing and preventable amount of illness, or morbidity, and in the number and preventability of physical defects which lower vitality and reduce working efficiency and happiness. In a somewhat careful investigation, published elsewhere,[1] the writer has attempted to compute from mortality statistics and other sources, by the methods used by life-insurance statisticians, the nature and extent of the national and school health problem. We can here only briefly summarize our relatively inaccurate and tentative findings, in the assurance, however, that great as they may seem the results are probably not exaggerations.

Death Losses.—The death losses to our country are enormous and largely preventable. The judgment of the best

[1] "School Health Administration," published by Teachers College, Columbia University, chapters I and II. (Out of print.)

experts versed in mortality statistics and in the results of various forms of hygienic improvement here and abroad agree pretty well with Professor Fisher's estimates of preventability given in his book on "National Vitality."[1] His estimate, arrived at with the assistance of thirty experts in health matters, is that in general about 42 per cent of the deaths of persons in the United States could be reasonably prevented or postponed, "if knowledge now existing among well-informed men in the medical profession were actually applied in a reasonable way and to a reasonable extent." An examination of his tables showing his estimates of preventability for deaths, from the manifold causes, will convince most intelligent persons that they are fairly conservative and that they are based on present data, counting not at all on the assured advance in preventive medicine.

Some of the leading facts relating to this great problem are as follows:

1. One-fifth of all the children born each year in this country die before they are a year old, approximately a half-million. Where there are fairly efficient and developed health agencies, such as boards of health, carefully conducted infant-mortality campaigns in this country have cut this death-rate to about one-tenth of these proportions.

2. Half of the persons born in our country die before they are forty years of age, and about half of these before the age of five.

3. The average age of persons dying is gradually rising, but is still below the age of forty—near thirty-eight.

4. Approximately 1,600,000 of our population die each year—about 670,000 (42 per cent) of reasonably preventable diseases. The economic losses due to these deaths are at least a billion dollars. These losses come in the form of public and private care of the sick and dead and in lost wages, but principally in the form of cut-off potential earnings. The value of a life at various ages can, in general, be somewhat easily

[1] Also published as a government report.

DEATHS FROM ALL CAUSES IN INDIANA

All Ages

computed, and the average value for all ages used by economists is $1,700.

The table on pages 10 and 11, taken from "School Health Administration," shows in some detail a condensation of the 1910 mortality statistics made by the author, and shows also the deaths of children of school age and the age groups of most deaths. The registration area is composed of those States and cities sensitive enough to their health needs to enforce reasonable registration of deaths. It reaches about three-fifths of the population.[1]

Those who wish to study educational hygiene in relation to national and community health problems may well examine the following table. A very desirable addition to such study would be (1) to get a free copy of the latest Mortality Statistics from the United States Census Bureau, and (2) to get the local reports of the boards of health of the community and State. Any careful study of such data will immediately raise in the mind of an intelligent and socially minded student and health worker the national and school-health problem. What can we do to prevent these terrible and largely unnecessary losses?

Illness and Physical-Defects Losses.—According to the best obtainable data, about 3,000,000 persons in the United States are constantly seriously ill. Their illness causes loss of wages to a computable number, lowered vitality, and frequently death. These illnesses, largely and increasingly preventable, cause further enormous economic losses not computed under deaths, which I have estimated, using Professor Fisher's and insurance methods, as about another billion dollars annually. The losses in happiness, the evil effects of breaking up homes, and all such losses of a personal, human, and psychological character are, of course, beyond computation. From these serious illnesses and the additional physical defects and minor illnesses comes more or less directly a large portion of the most serious blots upon civilization, such as

[1] 1910 U. S. Mortality Statistics.

TABLE I

CAUSES OF DEATH FOR THE REGISTRATION AREA, 1910 [1]

	All ages	CHILDREN OF SCHOOL AGES			Total 5–14	Age group of most deaths
		5–9	10–14	15–19		
All Causes	805,412	17,943	11,736	19,772	29,679	0– 1
I. *General diseases*	215,692	8,891	4,978	9,770	13,869	25–29
1. Typhoid fever	12,673	684	854	1,681	1,537	20–24
2. Malaria	1,167	58	40	67	98	20–24
3. Smallpox	202	6	6	17	12	0– 1
4. Measles	6,598	588	152	112	740	1– 2
5. Scarlet fever	6,255	1,731	442	232	2,173	5– 9
6. Whooping cough	6,146	228	17	10	245	0– 1
7. Diphtheria and croup	11,521	2,938	700	228	3,638	5– 9
8. Influenza	7,774	122	73	119	195	70–74
9. Cholera nostras	536	14	8	7	22	0– 1
10. Dysentery	3,446	47	15	13	62	0– 1
11. Erysipelas	2,442	8	14	35	22	0– 1
12. Other epidemic diseases	198	23	11	3	34	0– 1
13. Purulent infection, etc	1,877	73	62	86	135	0– 1
14. Rabies	64	13	9	6	22	5– 9
15. Tetanus	1,373	162	153	88	315	0– 1
16. Pellagra	368	4	5	12	9	30–34
17. Tuberculosis (of lungs)	73,214	489	1,048	5,166	1,537	25–29
18. Tuberculosis (other)	13,095	933	586	933	1,519	20–34
19. Rickets	455	13	8	4	21	0– 1
20. Syphilis	3,221	24	11	36	35	0– 1
21. Gonococcus infection	197	..	1	17	1	0– 1
22. Cancer and other m. tumors	41,039	83	76	152	3	60–64
23. Other tumors	553	9	4	6	13	65–74
24. Acute articular rheumatism	3,328	327	357	261	684	10–14
25. Diabetes	8,040	144	206	258	350	60–64
26. Leuchemia	864	44	35	39	79	40–55
27. Anemia, chlorosis	2,614	39	40	70	79	60–64
28. Other general diseases	5,014	4	10	67	14	0– 1
II. *Nervous sys.—special sense.*	77,991	1,368	889	976	2,257	70–74
29. Encephalitis	761	34	37	39	71	0– 1
30. Meningitis	7,619	683	365	294	1,048	0– 1
31. Spinal cord, other dis	4,101	264	146	130	410	65–69
32. Apoplexy, cereb. hem	39,701	47	46	103	93	70–74
33. Paralysis, without sp. cause	7,756	27	21	29	48	70–74
34. Epilepsy	2,287	79	118	172	197	25–29
35. Convulsions (nonpuerperal)	200	54	9	18	63	5– 9
36. Chorea, St. Vitus's dance	123	13	18	41	31	15–19
37. Nervous system, other d	2,069	70	58	63	128	50–54
38. Ear diseases	967	92	64	46	156	Under 1
III. *Circulatory system*	100,106	999	1,319	1,447	2,318	65–69
39. Pericarditis	650	32	32	14	64	65–69
40. Endocarditis, acute	4,792	203	226	196	429	55–59
41. Organic d. of the heart	76,178	716	1,011	1,158	1,727	70–74
42. Angina pectoris	3,869	7	12	17	19	65–69
43. Embolism and thrombosis	1,990	20	19	33	39	65–69
44. Lymphatic system, dis	255	14	9	9	23	0– 1

[1] Condensed from the table giving 189 different causes. The registration area is slowly enlarging, but in this year included only about three-fifths of the population. In many of the registration States the returns are inaccurate, and somewhat incomplete ("at least 90 per cent of the total"). We are far behind most European countries in records of both deaths and births.

TABLE I—*Continued*

CAUSES OF DEATH FOR THE REGISTRATION AREA, 1910

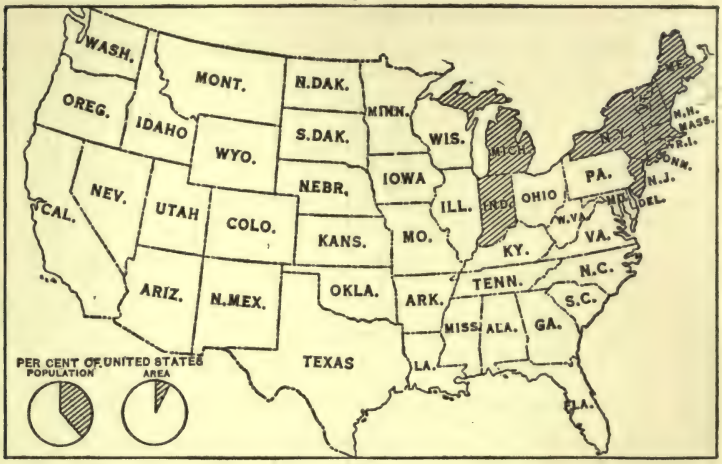
	All ages	CHILDREN OF SCHOOL AGES			Total 5–14	Age group of most deaths
		5–9	10–14	15–19		
IV. *Respiratory system*	100,835	2,035	956	1,517	299	0– 1
45. Nasal fossæ disease	135	9	9	5	14	0– 1
46. Larynx, dis. of	746	90	13	11	103	0– 1
47. Bronchitis, acute	7,229	90	21	21	111	75–79
48. Bronchitis, chronic	5,391	62	30	36	92	75–79
49. Bronchopneumonia	25,337	522	148	158	670	0– 1
50. Pneumonia	54,187	1,138	664	1,140	1,802	0– 1
51. Pleurisy	2,150	66	32	83	98	60–64
52. Pulmonary cong't'n, p. ap.	24,499	28	17	17	45	0– 1
53. Other d. of resp. system	1,174	16	13	28	29	0– 1
V. *Digestive system*	104,801	1,669	1,270	1,429	2,939	0– 1
54. Mouth and annexa, d.	423	11	4	6	15	0– 1
55. Pharynx	840	123	51	40	174	5– 9
56. Ulcer of stomach	2,203	13	18	47	31	45–49
57. Other d. of stomach (not c.)	8,403	116	57	73	173	0– 1
58. Diarrhea and enteritis	63,180	469	132	91	601	0– 1
59. Appendicitis and typhlitis	6,128	571	718	754	1,289	15–18
60. Hernia	2,192	8	6	21	14	65–69
61. Intestinal obstruction	4,486	127	88	117	215	0– 1
62. Other diseases of the intest.	1,571	25	20	22	45	0– 1
63. Cirrhosis of liver	7,485	15	16	25	31	50–54
64. Other diseases of liver	3,092	36	35	34	71	60–64
65. Peritonitis (nonpuerp.)	2,419	132	109	162	241	20–24
66. Other d. of digestive system	329	9	4	7	13	50–54
VI. *Genito-urinary sys. nonv.*	62,559	509	447	780	956	70–74
67. Nephritis, acute	5,665	253	165	199	418	40–44
68. Bright's disease	47,665	224	263	440	487	70–74
69. Kidneys, other d. of	1,389	22	6	16	28	0– 1
70. Other d. of uterus	774	1	5	29	6	25–29
71. Salpingitis and other f. d.	1,298	1	2	75	3	25–29
VII. *The puerperal state*	8,455	..	11	620	11	25–29
VIII. *Skin and cellular tissue*	3,008	26	14	31	40	0– 1
72. Gangrene	1,748	10	7	8	17	75–79
73. Abscess, acute	506	12	5	9	17	0– 1
IX. *Bones and locomotive organs*	1,317	100	95	89	195	0– 1
74. Bones, not t. b.	1,145	93	90	81	183	0– 1
75. Joints, not t. b. or rheum.	119	6	4	5	10	35–39
X. *Malformations*	7,998	76	36	20	112	0– 1
76. Hydrocephalus	685	30	11	4	41	0– 1
77. Congen. m. of heart	4,821	33	25	13	55	0– 1
XI. *Early infancy*	39,388	..	..	..	..	0– 1
XII. *Old age*	13,604	..	..	..	..	80–84
XIII. *External causes*	57,196	2,193	1,678	3,024	3,871	25–30
78. Suicide	8,590	1	31	326	32	35–39
79. Accidental or undefined	45,416	2,161	1,599	2,525	3,760	20–24
XIV. *Ill-defined diseases*	12,462	74	43	68	117	75–79

GROWTH OF THE REGISTRATION AREA FOR DEATHS, 1900–1911

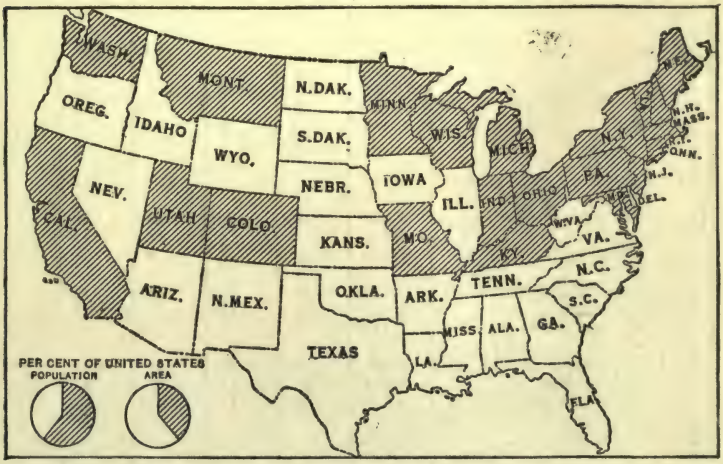
(From U. S. Mortality Statistics, 1911)

Up to 1880 only two States, Massachusetts and New Jersey, had registration laws.

1900



1911



NOTE.—In addition to the registration States (shaded in the cartograms), the registration area includes thirty-eight cities in non-registration States. No accurate data respecting the number and causes of death in nearly half our country can yet be made. Laws requiring registration are of first importance in non-registration States. The registration area for births is very much smaller.

alcoholism and poverty. Devine estimates that not less than one-fourth of all poverty is directly caused by illness. That from tuberculosis, from the best estimates, seems to be a very large portion of the whole. The lessening of tuberculosis means the lessening of poverty, and tuberculosis prevention is very largely an educational problem. A further statement of the general problem and the various means of solution may be found in the next chapter.

In brief, then, we see that the problem of health is one of the most serious that the country faces. The conservation of our natural resources, such as soils, minerals, forests, and water-power, is a mere bagatelle compared with the problem of the conservation of our human resources. Of these we are criminally wasteful. While we are making some headway in the control of typhoid, smallpox, tuberculosis, the diseases of infancy, and others, there has arisen in recent years an increasing number of degenerative diseases in middle life due largely to ignorance of personal hygiene.[1] Such increases tend to keep the death-rate as high as it has been in the past.

The School Health Problem.—While the reader is passing through this chamber of horrors and getting some acquaintance with a few of the phases of the health problem which it is necessary for us resolutely to face if we are to solve it, he should obtain some glimpse of the evil effects of ill health upon the schools, their efficiency, their pupils, and their teachers.

The *death* losses of pupils of school age, whether in school or out, are enormous and largely preventable. Undoubtedly many of these deaths are and will continue to be inevitable, but our success in decreasing the death-rate for many of the causes of death in these ages, and many other factors, tends to show that the ratio established by Fisher of about seventy per cent of preventability for these ages is not too high.

[1] See Coleman's "The People's Health," p. 228.

TABLE II[1]

Death-Rates at Various Ages

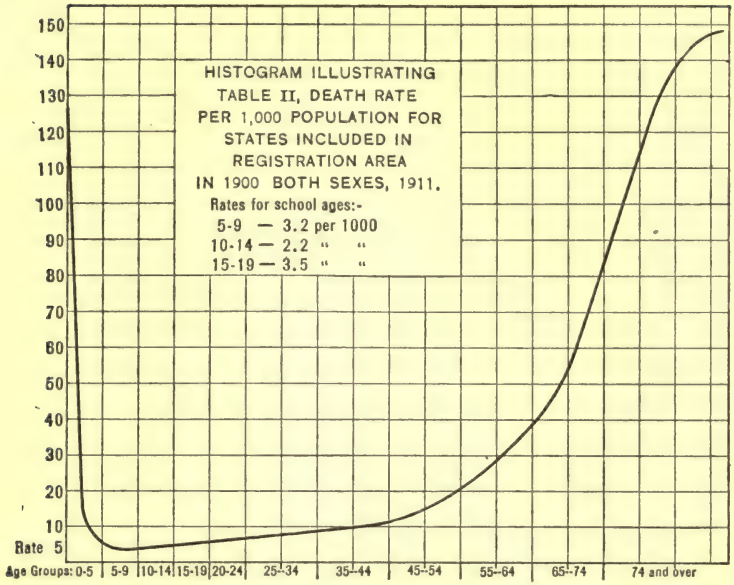
"The following table shows the changes in mortality that have occurred in the eleven years from 1900 to 1911 in the group of registration States as constituted in 1900. This area embraced about one-fourth of the total population of the United States in 1911 and hence the results are of much significance as showing the general tendency of mortality for the country as a whole."

Age group	Death-rate[2] per 1,000 population for States included in the registration area in 1900[3]						Per cent death-rate in 1911 represents of that in 1900[4]		
	1911			1900					
	Both sexes	Males	Females	Both sexes	Males	Females	Both sexes	Males	Females
All ages:									
Crude rate	14.9	15.8	14.0	17.2	17.9	16.5	87	88	85
Corrected rate[5]	14.6	15.3	13.9	17.0	17.6	16.5	86	87	84
Under 5 years	36.6	39.8	33.3	49.9	54.1	45.7	73	74	73
Under 1 year	125.5	138.6	112.1	161.9	178.4	145.0	78	78	77
1 to 4 years	12.8	13.3	12.2	19.8	20.4	19.1	65	65	64
5 to 9 years	3.2	3.4	3.1	4.7	4.7	4.6	68	72	67
10 to 14 years	2.2	2.4	2.1	3.0	2.9	3.1	73	83	68
15 to 19 years	3.5	3.7	3.3	4.8	4.9	4.8	73	76	69
20 to 24 years	5.0	5.3	4.7	6.8	7.0	6.7	74	76	70
25 to 34 years	6.3	6.7	6.0	8.2	8.3	8.2	77	81	73
35 to 44 years	9.4	10.4	8.3	10.3	10.8	9.8	91	96	85
45 to 54 years	14.5	16.1	12.9	15.0	15.8	14.2	97	102	91
55 to 64 years	28.4	30.9	26.0	27.3	28.8	25.8	104	107	101
65 to 74 years	58.3	61.6	55.1	56.5	59.5	53.7	103	104	103
75 years and over	143.0	147.4	139.2	142.4	145.9	139.3	100	101	100

[1] From 1911 U. S. Mortality Statistics. [2] Exclusive of still-births.
[3] Group includes Connecticut, the District of Columbia, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.
[4] The death-rate for 1911 for both sexes is only 87% of that of 1900 and the death-rate for males greater, 101 to 107%, than in 1900. Notice also that infant mortality decreased from 161.9 a thousand to 125.5 a thousand in 1911.
[5] Based on the standard million of England and Wales, 1901.

Effective health education of pupils and parents, and effective public-health service, ought to make possible an almost complete extermination of a large number of diseases in these hardy age periods from five to twenty.[1]

[1] "One interesting and notable thing about modern public-health work is its tendency to supplement purely administrative methods by educational ones."—Winslow.



NOTE.—The rate for both sexes in 1911 for these ten States is for the infants less than a year old 125.5, and for the ages two to four inclusive only 12.8. These data do not include still-births. The years ten to fourteen inclusive seem to be the hardiest years of life, although the sickness rate is higher than in certain other age groups. The number of deaths at the lowest part of the curve are as follows: 5–9—18,112. 10–14—12,337. 15–19—21,154.

There are, however, in the United States approximately 100,000 children of elementary and high-school age who die each year. Probably at least 60,000 of these deaths were unnecessary losses (*i. e.*, preventable), and 50,000, or half, would probably be a low estimate. In looking over the death-rates for various diseases in comparison with the number of cases of illness in many cities it has been found that the number of cases occurring and the proportion of deaths from the various ailments vary quite directly with the efficiency of the public-health agencies. Efficient health agencies decrease the number of cases of illness and the proportion of deaths from them. Many city and State boards of health print on

TABLE III

SHOWING THE PREVENTABILITY OF DEATHS OF CHILDREN OF ELEMENTARY SCHOOL AGE, 5–14, FOR 25 MOST NUMEROUS CAUSES OF DEATH, 1910

	CAUSES OF DEATHS	No. deaths in registration area	Per cent preventable	Total No. deaths in the U. S.	No. preventable deaths
1	Accidents	3,760	..	6,300	....
2	Diphtheria and croup	3,638	70	6,200	4,340
3	Scarlet fever	2,173	50	3,700	1,850
4	Pneumonia	1,802	45	3,050	1,370
5	Heart, organic disease	1,727	25	3,000	750
6	Typhoid fever	1,537	85	2,600	2,210
7	Tuberculosis of lungs	1,537	75	2,600	1,950
8	Tuberculosis, other	1,519	75	2,560	1,920
9	Appendicitis	1,218	50	2,160	1,080
10	Meningitis	1,048	70	1,600	1,120
11	Measles	740	40	1,250	500
12	Rheumatism, articular	684	10	1,150	116
13	Bronchopneumonia	670	50	1,140	570
14	Diarrhea and enteritis	601	60	1,020	612
15	Bright's disease, kidneys	487	40	820	328
16	Endocarditis, heart	429	25	730	182
17	Nephritis, acute, kidneys	418	30	700	210
18	Spinal cord, others	410	..	690	...
19	Diabetes	350	10	500	60
20	Tetanus, lockjaw	315	80	530	424
21	Whooping-cough	245	40	410	164
22	Peritonitis	241	55	400	220
23	Intestinal obstruction	215	25	390	97
24	Epilepsy	197	..	330	...
25	Influenza, grippe	195	50	330	82
		26,227	67[1]	44,270[2]	20,155

Total number of deaths, 5–14, in registration area, 29,679.
Total number of deaths, 5–14, in the United States, about 50,000.
Total number deaths preventable, about 33,500. Based upon 1910 U. S. Mortality Statistics and Fisher's Preventability Tables.

[1] Fisher's average. [2] Estimated.

their various bulletins these significant words: "Public health is purchasable. Within natural limitations a community can determine its own death-rate." And the prophecy of Pasteur has in some communities gone far toward realization: namely, that "it is within the power of man to rid himself of every parasitic disease."

The economic losses due to the cost of educating for several years in public schools the children who die in this period are of course a large source of public preventable waste.

TABLE IV

SHOWING THE PREVENTABILITY OF DEATHS OF CHILDREN OF HIGH-SCHOOL AGE, 15–19, FOR 25 MOST NUMEROUS CAUSES OF DEATH IN 1910

	CAUSES OF DEATHS	No. deaths in registration area	Per cent preventable	Total No. deaths in the U. S.	No. preventable deaths
1	Pulmonary tuberculosis	5,166	75	8,650	6,487
2	Accidents and undefined	2,525	..	4,230	....
3	Typhoid fever	1,681	85	2,830	2,405
4	Heart-disease, organic	1,158	25	1,940	485
5	Pneumonia	1,140	45	1,920	864
6	Tuberculosis, other parts	933	75	1,750	1,177
7	Appendicitis	754	50	1,270	635
8	Bright's disease	440	40	740	286
9	Suicide	326	..	550	....
10	Meningitis	294	70	500	350
11	Rheumatism, articular	261	10	450	45
12	Diabetes	258	10	450	45
13	Scarlet fever	232	50	400	200
14	Diphtheria and croup	228	70	400	280
15	Nephritis, acute	199	30	340	102
16	Endocarditis (heart)	196	25	340	85
17	Epilepsy	172	..	300	....
18	Peritonitis	162	55	280	154
19	Bronchopneumonia	158	50	280	140
20	Cancer and other tumors	152	..	260	....
21	Spinal cord, other diseases	130	..	220	....
22	Influenza, grippe	119	50	200	100
23	Intestinal obstruction	117	25	200	50
24	Measles	112	40	190	76
25	Apoplexy, cerebral hem	103	35	180	63
		17,016	67[1]	28,780	14,039

Total number of deaths, 15–19, in registration area, 19,772.
Total number of deaths, 15–19, in the United States, about 34,000.
Total number of deaths, 15–19, preventable, about 24,100. Based upon 1910 U. S. Mortality Statistics and Fisher's Preventability Tables.

[1] Fisher's average for all causes of death.

The illness and physical-defects losses of both teachers and pupils of the public schools are enormous, coming in the form of personal and public financial loss, of lowered vital efficiency and happiness, and of elimination, non-promotion, and retardation at school.

Combined, the physical-defects and illness losses are very great but as yet hardly computable. Ayres, Cornell, and others have given good reason to believe from their investigations that a large share of retardation is due to physical

TABLE V

Approximate Expectation of Life in a State that Has Kept Life Statistics for Several Years [1]

MASSACHUSETTS (WHITE)									
Age	1900			Six years 1884–1890			1880		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
0...	44.29	47.80	46.05	40.39	42.59	41.49	44.06	45.22	44.64
1...	53.13	54.96	54.05	49.29	50.40	49.85	51.18	51.20	51.19
2...	54.64	56.28	55.46	52.13	53.15	52.64	53.30	53.06	53.18
3...	54.69	56.31	55.50	52.37	53.45	52.91	53.88	53.60	53.74
4...	54.42	55.97	55.20	52.20	53.29	52.75	54.05	53.75	53.90
5...	53.90	55.50	54.70	51.93	53.02	52.48	53.92	53.67	53.80
10...	50.15	51.70	50.93	48.83	49.97	49.40	51.01	50.93	50.97
15...	45.79	47.49	46.64	44.78	45.98	45.38	46.85	46.86	46.86
20...	41.79	43.54	42.67	41.09	42.42	41.76	43.09	43.49	43.29
25...	38.23	39.71	38.97	37.79	39.04	38.42	39.81	40.44	40.13
30...	34.66	36.07	35.37	34.50	35.76	35.13	36.38	37.28	36.83
35...	31.09	32.42	31.76	31.20	32.48	31.84	32.96	34.13	33.55
40...	27.49	28.79	28.14	27.86	29.17	28.52	29.48	30.78	30.13
45...	23.89	25.16	24.53	24.51	25.86	25.19	26.01	27.43	26.72
50...	20.57	21.74	21.16	21.33	22.56	21.95	22.52	23.93	23.23
55...	17.25	18.32	17.79	18.15	19.25	18.70	19.02	20.43	19.73
60...	14.48	15.41	14.95	15.35	16.32	15.84	15.98	17.26	16.62
65...	11.70	12.50	12.10	12.54	13.38	12.96	12.95	14.08	13.52
70...	9.69	10.31	10.00	10.38	11.03	10.71	10.63	11.60	11.12
75...	7.68	8.12	7.90	8.21	8.68	8.45	8.31	9.13	8.72
80...	6.57	6.83	6.70	6.91	7.17	7.04	7.06	7.62	7.34
85...	5.46	5.54	5.50	5.60	5.66	5.63	5.82	6.12	5.97
90...	3.98	4.02	4.00	.....	.....	.....	.....	.....	.....
95...	2.50	2.50	2.50	.....	.....	.....	.....	.....	.....

The school ages are bracketed at the left. In Massachusetts a "person" four years of age in 1884–90 would probably live fifty-three years longer (52.75); in 1880 his chances were extended to fifty-four years, and in 1900 to fifty-five years. Recent health improvements have probably raised it to fifty-six years.

[1] From Bulletin 15 of the United States Bureau of the Census, entitled "A Discussion of the Vital Statistics of the Twelfth Census."

defects and the absence and illness caused by them.[2] I have shown that perhaps 25 per cent or more of all absences from school is caused by illness and that absence is a very large

[2] See chapter on "Physical Defects and School Progress" in the last edition of "Medical Inspection of Schools," and the appendix in this volume.

TABLE VI

APPROXIMATE EXPECTATION OF LIFE IN ANOTHER STATE THAT HAS KEPT LIFE STATISTICS FOR SEVERAL YEARS[1]

NEW JERSEY (WHITE)									
AGE	1900			SIX YEARS 1884–1890			1880		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
0...	44.06	48.27	46.17	40.11	43.55	41.83	45.59	48.05	46.82
1...	52.05	54.45	53.25	48.73	51.08	49.91	52.65	54.23	53.44
2...	53.63	56.07	54.85	51.66	53.81	52.74	54.39	55.71	55.05
3...	53.75	56.06	54.91	52.00	54.22	53.11	54.94	56.13	55.54
4...	53.39	55.77	54.58	52.04	54.25	53.15	54.94	56.03	55.49
5...	52.86	55.28	54.07	51.79	53.96	52.88	54.71	55.66	55.19
10...	49.27	51.59	50.43	48.62	50.82	49.72	51.57	52.52	52.05
15...	45.00	47.24	46.12	44.55	46.79	45.67	47.36	48.40	47.88
20...	41.04	43.12	42.08	40.72	43.09	41.91	43.29	44.51	43.90
25...	37.38	39.35	38.37	37.36	39.57	38.47	39.80	41.15	40.48
30...	33.84	35.79	34.82	34.05	36.18	35.12	36.26	37.76	37.01
35...	30.29	32.22	31.26	30.73	32.78	31.76	32.71	34.37	33.54
40...	26.87	28.67	27.77	27.46	29.37	28.42	29.20	30.80	30.00
45...	23.44	25.11	24.28	24.18	25.95	25.07	25.70	27.24	26.47
50...	20.18	21.64	20.91	20.97	22.54	21.76	22.33	23.70	23.02
55...	16.92	18.17	17.55	17.76	19.13	18.45	18.96	20.15	19.56
60...	14.19	15.23	14.71	14.91	16.09	15.50	16.10	16.89	16.50
65...	11.46	12.28	11.87	12.05	13.05	12.55	13.25	13.63	13.44
70...	9.52	10.16	9.84	9.94	10.71	10.33	10.90	11.12	11.01
75...	7.58	8.03	7.81	7.83	8.37	8.10	8.54	8.60	8.57
80...	6.47	6.83	6.65	6.71	7.07	6.89	7.40	7.36	7.38
85...	5.35	5.62	5.49	5.58	5.77	5.68	6.26	6.13	6.20
90...	3.93	4.06	4.00	.....	.....	.....	.....	.....	.....
95...	2.50	2.50	2.50	.....	.....	.....	.....	.....	.....

The school ages are bracketed at the left.

[1] From Bulletin 15 of the U. S. Bureau of the Census, entitled "A Discussion of the Vital Statistics of the Twelfth Census."

factor in causing retardation. Absence has a proved correlation with non-promotion, and illness is the chief cause of absence, especially the longer absences. Experiments carried on by Wallin in Cleveland and by Kohnky[2] in Cincinnati seem to indicate that mere *dental* hygiene has probably a decidedly favorable effect on the mental and physical status

[2] Kohnky, *Journal of Educational Psychology*, December, 1913.

of school-children. In the Cincinnati investigation a control class was used and the results seem to show a direct causal relationship between mouth hygiene and school progress.[1] Doctors and nurses and teachers of the public schools where medical supervision is carried on are unanimous in their opinion, based on observation, that school progress for very many children is materially hastened by the elimination of their physical defects and the cure of their ailments.[2]

My own studies of the rough data gathered in a survey of a number of cities seem to indicate that not less than about 15 per cent of elimination, 16 per cent of non-promotion, and 17 per cent of retardation is caused by the illnesses and physical defects of school-children. We are not yet ready to state, in general nor for any one city, precisely how much an aid to school progress and community health medical supervision and the various phases of educational hygiene are. The belief is warranted that they are great. Before accurate measurements can be made we must have very much more accurate statistical records and reports and much improved supervision by health specialists. Records and reports at the present time are entirely too vague, variable, and meaningless for any accurate knowledge of school health work. In a later chapter on medical supervision I give a tentative standard plan for the administration of educational hygiene, especially of medical supervision, and offer there for criticism and use a tentative standard terminology and classification of the multitudinous ailments of school-children. There it will be seen that, according to the best data obtainable, not far from one-third of the school-children will, on the average and in any one school year, be found to suffer from *no* ailments of a serious nature, one-third with *teeth defects only*, one-third with *teeth defects and two or more other ailments each*.[3]

[1] Wallin, *Dental Cosmos*, April, 1913.

[2] See articles in the *Psychological Clinic* for January, 1915.

[3] See the writer's survey of Rural School Hygiene in the Report on Rural Schools to the Pennsylvania State Educational Association, 1914, State Supt. N. C. Schaeffer, Harrisburg, Pa., Chairman.

These facts, then, set forth rather vaguely and inadequately the school health problem. About half of the school-children may be said to be seriously ailing and defective in any one school year and in grave need of the care of school doctors, nurses, dentists, physical-training teachers, and others. The need is for efficient agencies for *discovering* the exact health status of the pupil population, the health census, and then for further efficient agencies for *preventing* such ailments and for getting *cured and corrected* those found to exist. Undoubtedly this work, if well carried on, will place the school in close and intimate association with the home, the public-health agencies, the private organizations that may be interested in health advancement, and with the real life of the city or community. This is a consummation, of course, devoutly to be wished.

The aim of these school systems is to promote the welfare of the people by developing social efficiency in each child. The relation of educational hygiene to this general aim may be observed on analyzing social efficiency into its elements. These factors are:

(1) *Vital Efficiency.*—Health, freedom from physical defects, and physical development. (2) *Vocational Efficiency.*—Ability to make a good living honestly by performing necessary social service. (3) *Avocational Efficiency.*—The right use of leisure, wholesome enjoyment, and genuine happiness. (4) *Civic Efficiency.*—Good citizenship, public interest, ability in leadership, and co-operation. (5) *Moral Efficiency.*—Goodwill, spirit of social service, skill in promoting goodness.

It may be seen at once that the five divisions of educational hygiene have an intimate bearing on the attainment of these supreme ends of education. Especially do they contribute to the first and third factors of social efficiency. Foundational as it is, health work in the schools cannot be placed second in any list of minimal essentials of schooling for a democracy. What the draft has revealed we must now combat by all means at our command.

CHAPTER II

THE PUBLIC–HEALTH MOVEMENT

Public Health and Public Welfare.—Public health is the most fundamental and basic element of social, economic, and national efficiency. Wealth is but a symptom and function of health. Yet with our innate inclination to consider symptoms rather than to grapple with fundamental causes, we have, in our systems of social philosophy, either entirely left out the element of public health or given to it but passing attention. We have developed an immense science of economics and a philosophy of wealth, but have left the science of public health in a very fragmentary and incomplete state. With the recently awakened active interest in the promotion of public health the need of scientifically established principles is becoming very acute, but with reference to understanding public-health *needs* we are in a state of almost complete chaos. During the winter session of the various State legislatures, for example, about one thousand bills on public health were considered, ranging in importance from reorganizing whole State departments of health, or passing model vital-statistics laws, to the prohibition of roller towels. Some of the measures are insignificant, others unnecessary, while still others exhibit the propensity merely to follow certain styles or fashions. Doctor Frederick R. Green, the secretary of the Council on Health and Public Instruction, of the American Medical Association, commenting on such floods of bills, says that they disclose "a tendency on the part of the legislatures to follow prevailing fads in lawmaking." [1]

"The public-health movement to-day is going almost

[1] *The Survey*, September 27, 1913, p. 748.

too fast," says Professor Sedgwick,[1] "almost faster than the teachers and directors of the movement could wish, because a great many foolish things are being done to-day in the name of public health, and there are public-health fakirs as there are quacks and dealers in quackeries."

Since the interest in public health has gained such an impetus, and since so much activity is being displayed by governmental, civic, and private organizations, it becomes imperative to see that the movement is directed along proper channels in order that an unnecessary waste of energy and money may be prevented and that the fragments of public-health science may be woven into a coherent entity for the guide of legislators and public-health administrators.

At this stage of the movement it is necessary, therefore, to take stock of the methods used, of the forces at work, and of the achievements accomplished. It is a tremendous task and the present paper is but an elementary attempt to state the problem.

Preventive Medicine.—The foundations and possibilities of this great health movement lie largely in preventive medicine. "Although drugs are helpful to the individual in that they may lessen his suffering and hasten his recovery, they are of no avail in preventing disease in a population. Take the best-established cures in medicine, the drugs known as 'specifics'—iron in anemia, mercury in syphilis, quinine in malaria, antitoxin in diphtheria and tetanus—and who can say that they have exerted the slightest effect upon the incidence of these diseases in human communities? On the other hand, see what preventive medicine has accomplished in combating puerperal and surgical fevers, smallpox, malaria, yellow fever, rabies (in England it no longer occurs), Mediterranean fever, plague, and relapsing fever. . . . Many hundreds of thousands of lives throughout the world are now

[1] "The Public Health Movement in America—To-day and To-morrow," an address delivered before the Association of Life Insurance Presidents, December, 1913.

saved annually by preventive medicine."[1] And preventive medicine is but in its infancy. Its possibilities are immeasurable. With every new medical discovery new possibilities arise. The foundation of the public-health movement has already become enormous and it is widening from day to day.

The Aims of the Public-Health Movement.—The public-health movement may be broadly defined as a social effort to prevent disease, to lengthen the life and usefulness of every member of society, and to afford opportunities for a normal physical and mental development of society.

In its broad aspects public-health work consists in preventing preventable diseases by means of early diagnosis and efficient quarantine, in affording opportunities for effective treatment and cure of the sick, in combating filth, unhygienic living, insanitary conditions of work and habitation, in health education of individuals and communities, and in providing opportunities for sunlight, fresh air, pure food, and recreation. Each of these main branches divides itself into a great number of constituent elements. I shall not even attempt to enumerate them but shall indicate some of the results already obtained and some of the problems to be attacked.[2]

Prolongation of Life.—It has been estimated with more or less accuracy that the average length of human life in the sixteenth century was between eighteen and twenty years, and at the end of the eighteenth century was a little over thirty years; while to-day it varies in different countries from less than twenty-five to more than fifty years. The general death-rate of the city of Berlin has been reduced from 32.9 per 1,000 in 1875 to 16.4 in 1904, and to 14.7 in 1910. The death-rate of London has decreased from 20.9 for the four-year period of 1881–5 to 12.7 in 1910; for the same period

[1] Professor Geo. N. F. Nuttall, of Cambridge, England, "Proceedings of the Fifteenth International Congress of Hygiene and Demography," vol. IV, part 2, p. 417.

[2] See Devine's "Seventeen Health Demands" in *The Survey* for July 4, 1914.

Dublin shows a decrease from 27.5 to 19.9, Amsterdam from 25.1 to 12.4, Stockholm from 24.3 to 14.6, New York from 27.5 to 15.1 in 1911, Chicago from 21.5 to 14.6, and so along the line. The average death-rate in the whole of the registration area of the United States has decreased from 17.6 in 1900 to 14.2 in 1911. While the average death-rate all over the civilized world has for the last quarter of a century been constantly declining, the chief gains in saving life have been made at the *beginning* of the course, in the younger age groups. The death-rate in the *later* age groups, above forty, has been constantly *increasing*.[1]

The following is a table showing the death-rates for males and females, by age groups, for the years 1900 and 1911 respectively, for the registration States as they were constituted in the year 1900.[2]

COMPARISON OF MORTALITY OF MALES AND FEMALES BY AGE GROUPS

DEATH-RATES PER 1,000 POPULATION

AGE	MALES			FEMALES		
	1900	1911	Per cent increase or decrease	1900	1911	Per cent increase or decrease
Under 5....	54.2	39.8	−26.57	45.8	33.3	−27.29
5– 9.....	4.7	3.4	−27.66	4.6	3.1	−32.61
10–14.....	2.9	2.4	−17.24	3.1	2.1	−32.26
15–19.....	4.9	3.7	−24.49	4.8	3.3	−31.25
20–24.....	7.0	5.3	−24.29	6.7	4.7	−29.85
25–34.....	8.3	6.7	−19.28	8.2	6.0	−26.83
35–44.....	10.8	10.4	+3.70	9.8	8.3	−15.31
45–54.....	15.8	16.1	+1.90	14.2	12.9	−9.15
55–64.....	28.9	30.9	+6.92	25.8	26.0	+0.78
65–74.....	59.6	61.6	+3.36	53.8	55.1	+2.42
75 and over.	146.1	147.4	+0.89	139.5	139.2	−0.22
All ages....	17.6	15.8	−10.23	16.5	14.0	−15.15

From this table one can readily see:

1. That men's chances for longevity are considerably

[1] See Tables II, V, VI.

[2] Table quoted by Louis I. Dublin, in *American Journal of Public Health*, December, 1913, p. 1263.

poorer than women's, and that the reduction in the mortality rates has benefited women more than men; and

2. That the mortality rates for males, in 1911, exhibit a tendency to increase, beginning with the age group of from 45 to 54, and of women with the age group from 55 to 64. These increases in death-rates after 45 are chiefly due to the so-called degenerative diseases (including apoplexy, paralysis, and the diseases of the heart, circulatory system, kidneys, and liver). Mr. Rittenhouse, of the Life Extension Institute, has compiled the following comparative table of these diseases, for the years 1880 and 1909, for Massachusetts:[1]

DEATH-RATES FOR DEGENERATIVE DISEASES PER 10,000 POPULATION

Ages	1880	1909	Per cent of increase
All.....	23.21	43.26	86.38%
Under 5.....	7.92	10.36	30.8
5– 9.....	2.91	3.95	35.7
10–14.....	2.85	4.72	65.6
15–19.....	3.10	5.43	75.2
20–29.....	4.95	8.09	63.4
30–39.....	10.13	18.79	85.5
40–49.....	19.70	37.84	92.1
50–59.....	39.01	91.30	134.0
60–69.....	102.05	212.93	108.7
70 and over...	261.10	558.20	113.0

It can be seen in the right-hand column that the great increases are for persons over forty, and above that age the increase from 1880 to 1909 is from about 23 to 43 per cent.

Another disease deserving consideration in this connection is cancer. Approximately 75,000 deaths annually are attributed to this disease in the United States, and the indications are that a steady increase of the death-rate from cancer is taking place in this country at ages over forty-five. Cancer is now of even greater importance than tuberculosis. Whether

[1] *Popular Science Monthly*, April, 1913, pp. 376–380.

this rise of cancer is a result of a better recognition of the disease or whether it is a real rise cannot as yet be definitely determined. But there is a great possibility for prevention of the disease by education and proper diagnosis in the early stages. Recently a national society has been formed for this purpose.

The very large increase in the death-rates from these diseases, particularly noticeable in the age groups above forty, is a sad commentary upon our civilization. The wear and tear of modern life, the nervous strain and high tension to which we are all subjected, ill adaptation to changing conditions, unsound habits of life, and the pernicious after-effects of the diseases of childhood, youth, and middle age are responsible for this disquieting phenomenon.

How living habits affect mortality is strikingly demonstrated by the experience of the United Kingdom Temperance and General Provident Institution, described by Doctor E. L. Fisk.[1] According to the records of the above-mentioned institution, "two large bodies of lives, almost equal in numbers, and homogeneous except for the use of alcohol, moved alongside of each other for forty years, and the group of abstainers at all times exhibited a markedly superior vitality to the other group, the non-abstainers, the total difference in favor of the abstainers during the period covered being 27.4 per cent, although the mortality among the general, or non-abstaining, class was only 91 per cent of that expected according to the British O^m Table, representing the experience of sixty-three British officers." We have no similarly direct statistical evidence on the effects upon the death-rate of bad housing conditions, insanitary working conditions, lack of school medical supervision, lack of health education, etc. We know, however, that dark rooms and dusty trades, the use of phosphorus, mercury, lead, and other similar substances in manufacture, and the failure to provide for the health of the young, are potent causes of much morbidity and

[1] *Popular Science Monthly* for April, 1913, p. 382.

mortality. It has been estimated that in this country each year about 500,000 industrial accidents occur, at least one-half of which might be prevented; that we have in our midst every year 13,500,000 cases of industrial sickness, involving a loss to society of about $800,000,000, and that of this loss we can save at least one-quarter.[1] Here is a burning problem, but the public-health movement cannot as yet boast of great accomplishments in these directions. Studies are being made and remedial legislation devised, but the machinery for its enforcement is inadequate, and, what is almost as important, no adequate educational machinery is at work to instruct and train the large masses of our people in personal hygiene, sound health habits and ideals of life, and the prevention of disease.

Typhoid Fever.—The prevalence of typhoid fever is a good index of social and sanitary conditions. It is a disease whose etiology and method of transmission are well known, and is therefore well controllable. It is a disgrace to our civilization that, in the registration area of the United States in 1911, there should have been from this one disease 12,451 deaths. These deaths from typhoid mean at least 124,510 cases of prolonged sickness (ten times the number of deaths) whose origin was clearly due to the drinking and eating of food which was contaminated by the excreta of typhoid patients. In the majority of our cities drinking-water is obtained from rivers and lakes into which typhoid-infected sewage is or may be discharged. It is gratifying to learn that many of the cities are taking steps to safeguard the quality of the drinking-water by installing filter plants. But still a comparison of the death-rates from typhoid in European and American cities is a severe indictment of our indifference in matters of health and life protection. The following is a comparative table of the death-rates from typhoid fever in certain large cities of the world for the year 1910:

[1] John B. Andrews, "Industrial Diseases and Physicians," *Journal of the American Medical Association*, April 15, 1911, vol. 56, p. 1132.

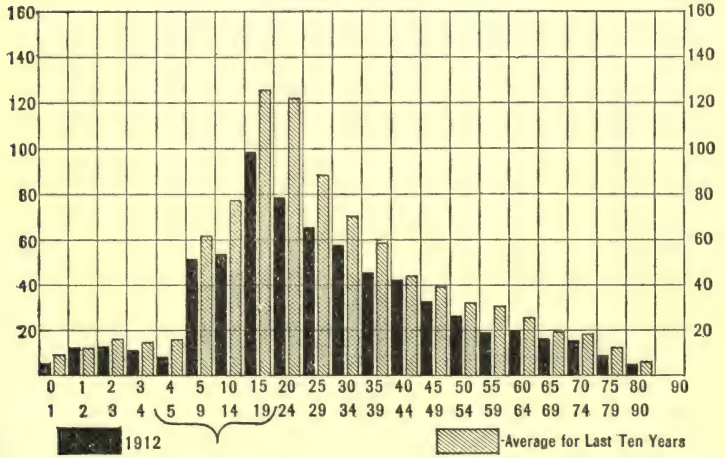
DEATHS FROM TYPHOID FEVER PER 100,000 POPULATION

City	Death-rate	City	Death-rate
Hamburg	2.5	New York	11.6
Berlin	3.6	Boston	11.6
London	4.0	Chicago	13.7
Vienna	4.1	Philadelphia	17.4
Paris	6.7	Washington, D. C.	23.2
Average	4.2	Average	15.5

Not all of the typhoid fever, of course, comes from polluted water supplies. A great deal of it comes from polluted milk and its products, from oysters, vegetables, shell-fish, etc.; and a good deal of it also comes from the polluted fingers of those who are either carriers (well, yet carrying the germs) or who attend patients and do not take care to clean and disinfect themselves properly. It has been estimated that at

TYPHOID FEVER DEATHS IN INDIANA

By Ages



Typhoid fever, like tuberculosis, finds more victims in the years immediately following the school period, possibly somewhat earlier. Typhoid is 85 per cent preventable, according to Fisher and others. Most deaths occur from August to December.

least 10 per cent of typhoid in New York City is of this so-called secondary origin. Here, again, the need of education in hygiene is obviously a potent force in disease prevention.[1]

A great deal also remains to be done in the country districts, where the prevalence of typhoid is very great. Much of our city typhoid is of direct rural origin, as evidenced by the characteristic increase of the wave of prevalence of the disease in the early autumn when people return from their summer vacations in the country.

Pure Food.—The fact that many cases of typhoid and other diseases are derived from milk and other perishable foods leads to the consideration of the food problem, which of late has received much popular attention. Unfortunately, however, perhaps too much emphasis is being laid on the use of preservatives in canned foods and not enough stress on the control of perishable foods, which are the most important carriers and disseminators of disease. Very few instances of death or serious illness can be clearly traced to food preservatives or to such so-much-discussed substitutes as oleomargarine, glucose, etc., but hundreds of thousands of deaths are undoubtedly due directly to contaminated milk, water, meat, oysters, and other perishable foods. The public-health movement has not as yet definitely stated the food issue or clearly indicated its proper mode of solution.

The food problem has, of course, as great an economic as a health aspect. The economic element of the problem is very important but it should not be confused with the health issue. To add apple jam to raspberry jelly, or potato flour to sausage, may be good business and bad ethics, but it is largely a matter of indifference from the point of view of public health. Whether a certain appetizing and high-priced preparation or expensive cut of meat has little nutritive value is also almost entirely an economic problem. That March or April eggs are kept in cold storage till November and then

[1] See Winslow's article on "Man and the Microbe" in the *Popular Science Monthly* for July, 1914.

bring better prices than they would in April is also a matter of practically no concern to the public-health administrator. His concern is to see that the eggs or meat are fresh and sound when put into cold storage, and also that when once taken out of storage and allowed to thaw they are not put there again.

Our present stage of industrial development has created a need for cold storage and the production of foods on a factory scale. It would be useless to combat this tendency. It is necessary, however, to control this modern wholesale production of foods in a rational and scientific manner and see that the conditions under which they are being produced are sanitary, that the workmen employed are healthy and cleanly, and that the raw products used are free from contamination and disease. The sporadic and irrational outbursts of revolt with little scientific basis have resulted in a hodge-podge of legislation which is a hardship and a nuisance to the honest producer, and is, at best, of little benefit to the consumer. At the present time there is practically no uniformity of standards and no uniformity of requirements. What may be legal in one State may be illegal in another, and *vice versa*. As Mr. Dunn, the author of a standard digest of food laws, says, "pure food legislation is a mass of inconsistencies. The federal authorities and the State of Wisconsin say that flour bleached with nitrogen of peroxide is injurious. But Missouri, Oklahoma, Indiana, South Carolina, and Wyoming permit its sale if the bleaching process is indicated in the label. Illinois has made it illegal to bleach grain with sulphur dioxide, yet the sale of this grain, when properly labelled, is permitted by the federal law."[1]

What the public-health movement has not as yet accomplished in this direction is *scientific standardization* and the *securing of uniformity of legislation*. If, after reliable scientific data on a certain problem had been obtained, the representatives of the several States would come together and agree

[1] New York *Times* for January 25, 1914.

on a certain method of procedure and secure approximate or standard legislation for its enforcement, the spectacle of two adjoining States having different laws on the subject, with all its injurious effects, would be made impossible.

There are many matters which could even at present be dealt with adequately if a common standard were adopted. Why, for example, should the unscrupulous milk-dealer whose milk has been barred out of one city, because it has been found to be infected with typhoid-fever germs, be allowed to sell it in another city where the regulations are less exacting and thereby cause an epidemic of the disease? Why should the owner of tuberculous cattle be allowed to sell his meat within a State when the federal authorities would condemn it for interstate commerce? These are some of the many problems concerning the food question which the public-health movement must solve in the interest of efficient administration and the proper protection of society, and which can only be accomplished by proper co-operation of the various public and private health agencies.[1]

Infant Mortality.—As some one has said, the business of being a baby is an extremely hazardous one. As late as the year 1912, with all our efforts to reduce infant mortality, out of the total of 838,251 deaths in the registration area of the United States, 147,455 deaths, or 17.6 per cent, occurred among children under one year of age, and 204,639 deaths, or 24.4 per cent, among children under five years of age. Almost one-fourth of all the deaths occur before the child reaches the age of five, three-fourths of which occur in the first year of life. Fortunately there has been a marked reduction in the infant death-rate in recent years. The following table gives a comparison of the death-rates under one year of age in the same States and cities for the years of 1900 and 1911.

In some States and cities the reduction in infant mortality was more than 30 per cent during this twelve-year period. In Rhode Island it has decreased from 197.9 to 138.6 per

[1] See also the chapter on School Feeding.

DEATH-RATE PER 1,000 POPULATION UNDER ONE YEAR OF AGE

Area	1911	1900	Per cent of decrease
STATES OF THE REGISTRATION AREA IN 1900....	129.5	159.3	19
Connecticut.....	130.9	156.8	17
Maine.....	110.9	144.1	23
Massachusetts.....	143.3	177.8	19
Michigan.....	111.4	121.3	8
New Hampshire.....	150.3	172.0	13
New Jersey.....	131.5	167.4	21
New York.....	128.8	159.8	19
Rhode Island.....	138.6	197.9	30
Vermont.....	102.0	122.1	16
CITIES WITH 100,000 POPULATION OR OVER:			
San Francisco.....	104.8	152.2	31
Denver.....	131.9	162.3	19
Washington, D. C.....	170.0	274.5	38
Chicago.....	123.3	146.6	16
Boston.....	160.9	194.1	17
St. Louis.....	123.8	162.4	24
New York City.....	130.6	189.4	31
Philadelphia.....	141.9	201.9	30

1,000 children under one year of age. In the city of Washington, D. C., it has been reduced from 274.5 in 1900 to 170.0 in 1911, and so on.

The deaths of infants have both hereditary and environmental causes, the latter being much more important; diarrheal and respiratory diseases which result from bad feeding, bad air, filth, ignorance, carelessness, and poverty being the chief causes of infant mortality. The main bulk of infant deaths, in the last analysis, are of an environmental origin and can be annihilated only by a change in environment, including proper education.

Milk Stations.—One of the potent factors in reducing infant mortality has been the milk station. Thorough and repeated studies of infant mortality here and abroad have shown that the chances of a breast-fed child are at least five times better than the chances of an artificially fed baby. Nature did not intend that cows should nurse human babies, and our carelessness and ignorance have added additional

dangers to this anomaly. If a large percentage of our babies must, for economic and other reasons, be artificially fed, then steps must be taken to secure for them safe food. Whenever this has been tried and milk depots established, infant mortality has been decreased.

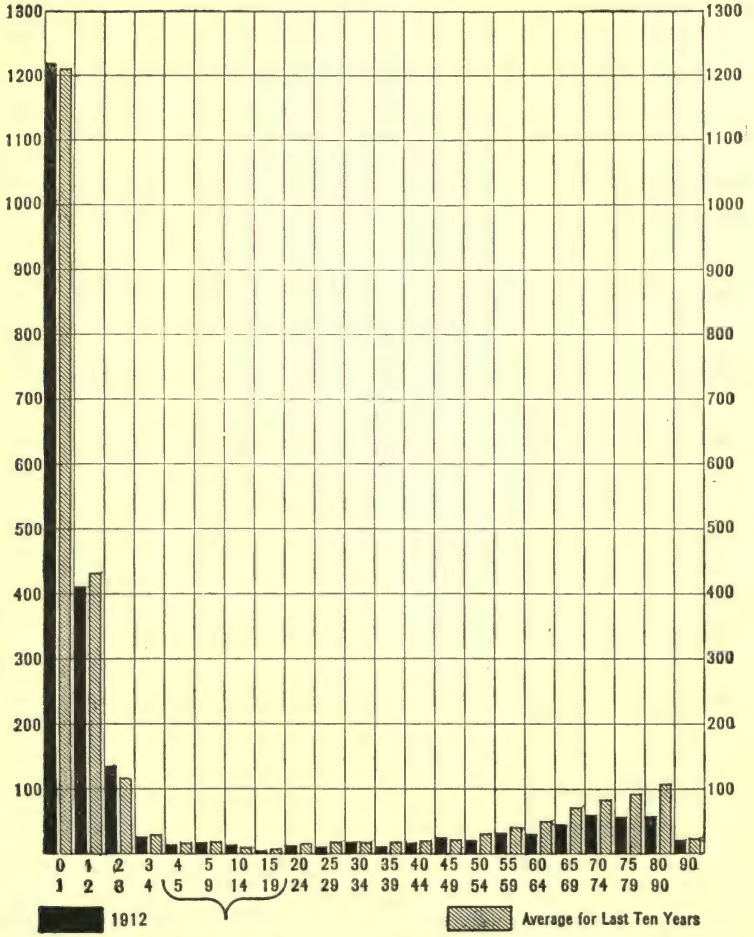
Education of mothers at the milk depots, at the schools, or both in one, is a factor in the situation whose importance should not be underestimated. In his paper on "Infant Milk Depots," read at the Conference on Infant Hygiene held in conjunction with the Philadelphia Baby Saving Show, 1912, Doctor Rowland G. Freeman estimated on the basis of much experience that milk stations plus education of mothers can produce a 60-per-cent reduction in infant mortality, of which 15 per cent should be credited to instruction, leaving a net gain of 45 per cent due to pure milk.[1] These figures are almost as arbitrary as they are optimistic. We have no means to measure the importance of instruction in hygiene, and nowhere in this country have we secured a 60-per-cent reduction in infant mortality. One reason for our failure to secure it lies in the fact that we have not taken steps to decrease infant mortality from the so-called congenital diseases from which deaths occur and which constitute 37 per cent of the total infant mortality in the registration area during the first month of life. The greatest reduction in mortality has taken place in the case of diarrheal diseases, then in respiratory, and very little in congenital diseases, including in this class of diseases congenital debility, malformations, premature births, injuries at birth, etc.

Prenatal Work.—To bring about a further reduction in infant mortality the public-health movement must devise means for reducing the number of deaths from congenital diseases. This can in a large measure be accomplished through centres for prenatal care of the mothers. The report of the Russell Sage Foundation on "Prenatal Work in Certain American Cities," presented at the Fifteenth International

[1] Proceedings of the Conference on Infant Hygiene, 1913, p. 201.

DIARRHEAL DISEASES IN INDIANA

By Ages



These diseases are the chief infant destroyers and are largely preventable. Can we not train for this phase of parenthood in the schools?

Congress on Hygiene and Demography in 1912, shows that the work is still in the initial stages, there being but a few scattered efforts here and there.[1] Realizing the lack of care of expectant mothers and the resultant appallingly great death-rate from congenital diseases, Doctor Newmayer advocates municipal supervision of maternity.[2]

"There should be legislation which would require all hospitals and dispensaries conducting an outdoor service to report to the health officer the names and addresses of all expectant women presenting themselves at these institutions for confinement. The city authorities should have trained nurses detailed to visit these prospective mothers during the last month or two of pregnancy, observing any signs of abnormality, instructing the mother in personal hygiene, care of the breasts, and preparing the mother for the time of labor. The nurse should continue her visits after the birth of the child, in order to instruct in the care and feeding of the baby. Such precautions would reduce materially the early deaths by avoiding many accidents and would also assure more breast-fed babies. In such work the visiting municipal nurse would be a logical solution of the midwife problem. Foreign mothers, realizing the value of the kind of care and attention given to them, would naturally wean themselves away from the services of careless and uncleanly midwives, and those midwives remaining in practise would be compelled to become more skilled and painstaking in their work."

This is but a logical extension of the work which is now being carried on by the larger cities of the country in the interests of the conservation of the child and which is bound to expand. Public schools through home-visiting nurses and consultation hours at schools for mothers and expectant mothers are already doing much valuable service. The twentieth century has been dedicated to the welfare of the child, and the promise is great.

[1] Ellen C. Babbitt, Proceedings of the Congress, vol. 3, pt. 1, p. 304.
[2] S. W. Newmayer, Proceedings of the Congress, vol. 3, pt. 1, p. 402.

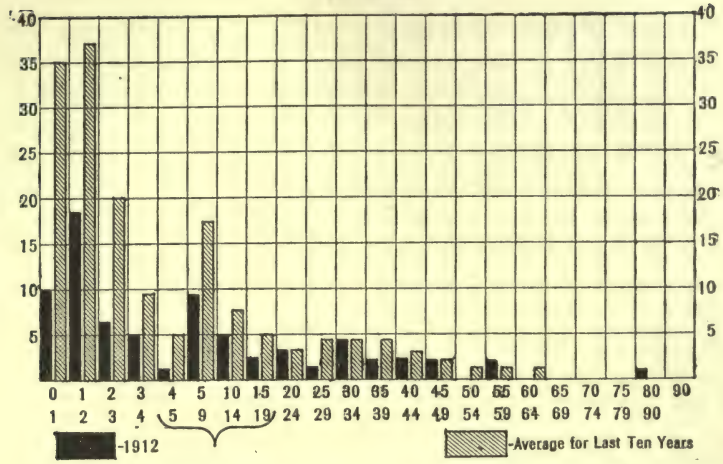
School Medical Supervision.—One of the first activities in the direction of child conservation was medical supervision, or "inspection," of school-children. When first organized, it met with the objection that it was a measure to pauperize the people, forgetting that public schools were inaugurated as pauper schools and that now they are compulsory. The experience of the last fifteen years goes to show that the communities that have introduced medical school inspection have been entirely justified in their expenditures by assuring to their future citizens a good start in life, since the majority of the children's ailments and incipient diseases are being discovered at a period when they can easily be remedied. Many of the parents of the children who are found suffering from one or another physical defect take steps to have these defects corrected or cured. Many of them, however, are too indifferent, too poor, or too ignorant to take the proper action and are, unfortunately, more ready to evade health advice than to follow it. And here is the point where medical school inspection frequently fails. As at present constituted, it does not commonly go much beyond the *pointing out* of defects, leaving it to those most interested in the welfare of the children to have them attended to and treated. A recent study of the efficiency of the system based on the records of four schools in the city of New York showed that when the school authorities co-operate with health officers a very high percentage of treatments is obtainable, and where there is no such co-operation the percentage of treatments does not in any class of ailments exceed 70 per cent. Then, of the cases treated, at least 25 per cent resulted in "no cure" or "no improvement." [1]

Whooping-Cough.—Great strides have been made in child conservation, yet in this field a great deal remains to be done. We have not as yet turned at all toward prevention of a very serious and fatal disease which kills many thousands of chil-

[1] E. H. Lewinski-Corwin, "The Practical Necessity of School Clinics," a paper read before the Fourth International Congress of School Hygiene, Buffalo, N. Y., 1913, and later printed in the *Popular Science Monthly* for May, 1914.

MEASLES DEATHS IN INDIANA

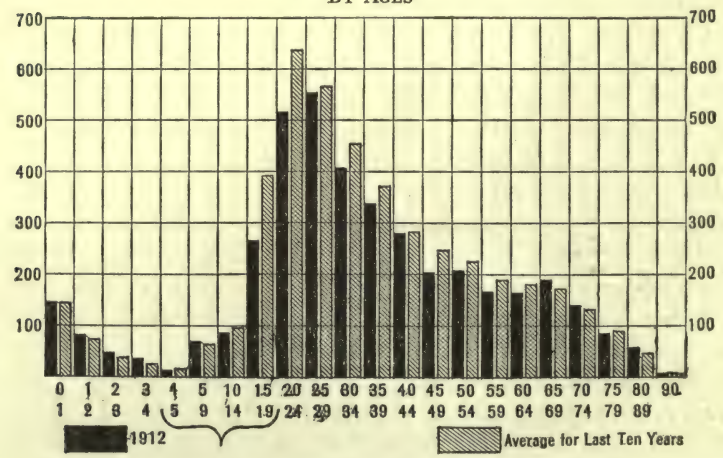
By Ages



Showing the ages when measles are most fatal and common and the importance of home care in the pre-school years.

TUBERCULOSIS DEATHS IN INDIANA

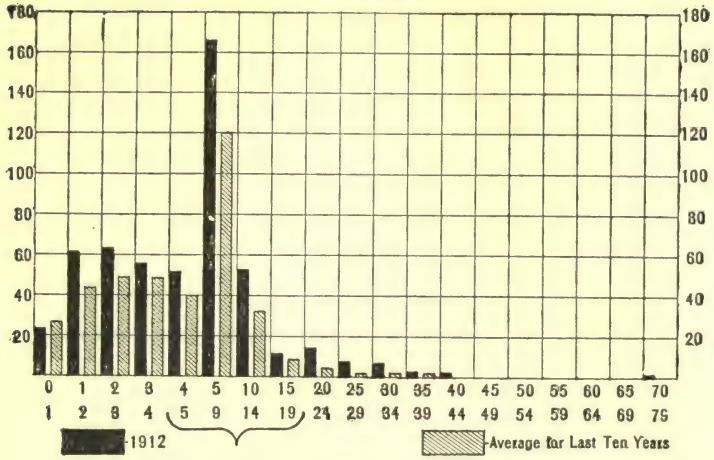
By Ages



While tuberculosis (all forms) is not relatively very frequent in the school ages according to this chart, yet deaths from tuberculosis stand near the first in causes of death among school-children, and the school must help eliminate the deaths of former pupils.

DIPHTHERIA DEATHS IN INDIANA

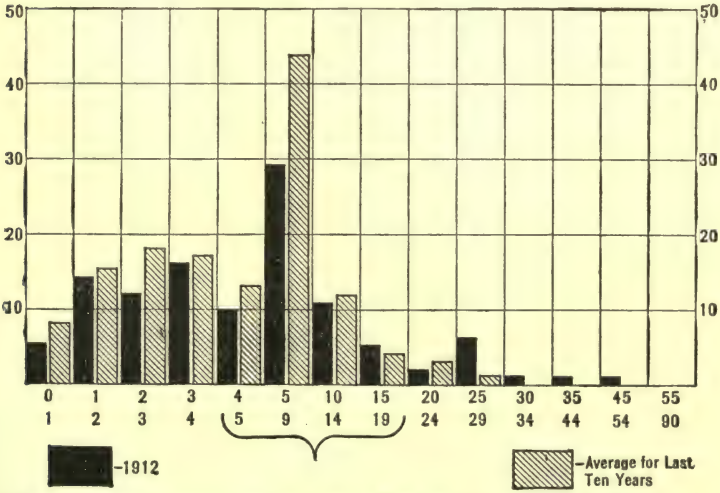
By Ages



Diphtheria finds its victims in the pre-high-school years. Most deaths occur from September to January.

SCARLET FEVER DEATHS IN INDIANA

By Ages



Scarlet fever is another disease of the pre-high-school period, quite largely. Deaths occur throughout the school year, but the number is a third as great throughout the summer.

dren per annum and the death-rate of which is as high as that of scarlet fever and, in some parts of the country, much higher. I refer to whooping-cough. The recent reports of Doctor Rucker, of the United States Public Health Service, and of Doctor John Lovett Morse, of Harvard, deserve serious consideration. It is true, as Doctor Rucker says, that, "if bubonic plague were to kill as many children in the United States in one year as whooping-cough does, the whole world would quarantine against our country." And yet the disease is popularly regarded as of a trifling nature, and scarcely any measures are being taken to limit its spread and diminish the death-rate from it. Only twenty-nine of the forty-three States that answered an inquiry made by Doctor Morse require reporting of the disease to the health departments, and in those where notification is required very little attention is paid to it by physicians.[1]

Disinfection after this disease is required by law in only four States of the Union and "recommended but rarely enforced" in but one. In some States there is no law forbidding the attendance of children with whooping-cough at schools; others forbid but have no regulations as to how long they should be kept out of schools. The same inadequacy and lack of definiteness relates to regulations prohibiting the school attendance of other children in the family. And then, "there is almost no provision for the hospital treatment of whooping-cough in this country." There are only a few hospitals in the country that have provisions made for these cases. In this connection it may be of interest to quote the medical officer of the Local Government Board of London, who, in speaking of whooping-cough and measles, says, "the most hopeful line of action in respect to both of these diseases appears to lie in the hospital treatment of patients for whom adequate domestic nursing cannot be secured."[2]

[1] "Whooping-cough," *Journal of the American Medical Association*, May 31, 1913, pp. 1677–1680.

[2] Forty-first Annual Report of the Local Government Board, 1911–12, p. xxv.

There is also no provision for the treatment of these cases in the out-patient departments of the hospitals. In the majority of the clinics the children are not allowed to return for treatment for fear of infecting other children in the waiting-rooms. In some clinics they are allowed to return and are "treated on the sidewalk," at the beginning or end of the clinics. In a few clinics only are these cases treated at an entirely different hour from the other patients. We have here an important and serious task before us.

Contagious Diseases.—The control of contagious diseases and the matter of efficient home and school quarantine occupy a central position in public-health administration. Contagious diseases come and go in waves or cycles recurring more or less regularly despite the comparatively definite knowledge we possess of the causes and methods of transmission of some of them. To what extent isolation or segregation of the sick is an element in the control of such diseases we have no direct statistical data to determine. We know that rise and fall in the waves is dependent on the ratio of the number of infected persons to the available infectable population. We can observe this particularly well with reference to some diseases, like smallpox, for instance. When the occurrence of cases of smallpox becomes known in a community there is a universal rush for vaccination and the epidemic soon dies out. After a lapse of a few years, during which no thought has been given to the disease and during which immunity in many instances has ceased and the available infectable population has increased, the wave begins to rise. This is probably true of every contagious disease. The difference in the incidence of the same disease therefore is an indication of certain conditions with reference to immunity. Segregation and isolation of cases is undoubtedly the most important movement in the situation, the extent of which we are thus far unable statistically to determine. The comparison of the two curves of incidence of measles in Philadelphia and New York shown on a chart published by the Prudential

Life Insurance Company suggests that the tenement-house congestion of a large portion of the population of the city of New York may be the reason for the greater incidence of measles in New York than in Philadelphia.

Vital Statistics.—As can perhaps be seen from this hasty review, our community health programme has not been worked out in detail; plans for a rational development have not been laid out carefully and with precision; the various elements entering the field have not been scrutinized, balanced, and weighed against each other. There is a great deal of dilettanteism and inefficiency about our public-health administration. One reason for this state of affairs is lack of the indispensable bases of correct judgment, adequate vital statistics. When only 60 per cent of the population of this country is included in the registration area, when our returns as they exist are incomplete and unreliable, and then, when collected, no adequate analysis of them is made in most of the communities, how can we expect to be able to direct the course of public-health administration with precision? In very many instances, in view of the lack of adequate reliable data, we have to depend on theories and suppositions which may or may not be correct, having no foundation in definite ascertainable facts.

Take as an average example the antituberculosis campaign. In his masterful pamphlet on "The Fight Against Tuberculosis and the Death Rate from Phthisis,"[1] Karl Pearson takes exception to certain assertions and points out with great acumen the flimsy and scanty grounds from which we draw our deductions with reference to the various factors in the fight against tuberculosis. The following is an example of perfectly sound reasoning for which no statistical evidence is at present available. The Department of Health of the City of New York has recently published a study made by the Council of Jewish Women on "The Subsequent History of Patients Discharged from Tuberculosis Sanatoria."[2] San-

[1] London, 1911. [2] "Monograph Series," No. 8, October, 1913, p. 18.

atoria statistics are extremely poor, and the report, after an analysis of the medical data of three tuberculosis sanatoria, says: "A hasty study of the foregoing three tables might lead to the conclusion that sanatorium treatment of the tuberculous was largely futile. As a matter of fact, however, this would be a great mistake. The work done by the sanatoria is not only highly beneficial to the patients, but is absolutely indispensable in the campaign against tuberculosis."

This view is probably entirely right but it does not follow from the statistics analyzed. If public health is ever to be raised to the dignity of a science with sufficient authority to bestow on its adepts the degree of D.P.H. (Doctor of Public Health), it must endeavor to procure indisputable proof for its assertions and beliefs. We are not yet sufficiently aroused to the crying need of what Professor Pearson calls "an efficient medico-statistical logic."

Municipal Expenditures for Health.—In spite of the oft-repeated saying that an ounce of prevention is worth more than a pound of cure, and in spite of the wide-spread recognition of the fact that public health is purchasable, our community appropriations for public health do not indicate that we apply these principles on a large scale in practise.

Out of a total $449,219,789 spent by 184 cities of the United States in 1910, $9,059,173, or 2 per cent only, went for health conservation proper.[1] The average per-capita cost of city administration in the United States (excluding payments for expenses of public-service enterprises) was $16.45 in 1910. Of this amount only 33 cents went for health conservation, about one-fiftieth. The smaller the cities, the smaller is the average per-capita cost for public health. In the cities of Group I, *i. e.*, cities having a population of 300,000 or over, the average for health conservation is 41 cents; in the cities of Group II (from 100,000 to 300,000 population) it falls to 27 cents. Cities of Group III (population 50,000 to 100,000) spend 21 cents per capita, and those

[1] "Statistics of Cities, 1910," p. 135.

of Group IV (population 30,000 to 40,000) can boast of an expenditure for health of but 19 cents.[1]

The health conditions in the smaller towns and country districts are particularly unsatisfactory.

Conclusion.—The foregoing cursory review presents the main problems of the public-health movement, which is gaining a tremendous impetus in this country. It can be seen that a great deal remains to be done, but the most important problems facing the movement are education, concentration, and co-operation, all essential to the conservation of effort and to the checking of unnecessary waste of energy and money. After a statement of the hereditary basis of health work in the next chapter, the later chapters will show how to meet many of these problems through the widening influence of the public school, democracy's chief agency for permanent health improvement.

[1] Same report, p. 64.

CHAPTER III

HEALTH AND HEREDITY

The Infinite Varieties of Traits in American Children.—Modern views of heredity in man start with the principle of the essential diversity of human beings in any mixed population such as the United States affords. Though there are countries, using the word in its broadest sense, in the Old World whose population is blue-eyed, others where all the people have curly or kinky hair, others where the nose is aquiline, others where practically all are tall, and so on, in this country all these physical traits are for the most part much mixed together. It is because the population of this country is so greatly hybridized that the people are so different. It follows, first of all, that there are few rules that hold for all people. A neglect of this fact is in part responsible for the failure of works on pedagogy, or hygiene, or medicine, to command universal respect. We learn that the child's mind works so and so, in face of the fact that "the child" is an abstraction; we are taught how to care for the teeth, despite the fact that "the teeth" are a mythical thing; and we learn of the prognostication of "typhoid fever" as though it were a definite phenomenon that needed only to be seen to be recognized, instead of the different kinds of behavior of various living human bodies to the parasite that is called *bacillus typhosus*.

As I have said, *the* child-mind is a pure abstraction. Actually we have the minds of various children which are, in the extreme, so unlike that they have few features in common. Nor does it help much to divide them into the feeble-minded and the normal, or the wayward and the normal, for "the

normal" is itself a scholastic and pedantic figure of speech and does not, strictly speaking, correspond with anything found in nature. The teacher who relies solely upon what he has learned from the books about *the* child's mind will be far less successful than the teacher of common sense who has had a wide range of experience with *children's minds*.[1]

Similarly, the instructions as to the care of "the teeth" are of comparatively little use to certain races, notably West African negroes, whose teeth are highly resistant to caries, and their faithful application will probably do little to delay the ravages of decay in the teeth of those who are non-resistant. How often may one hear of a white person who has not lost a tooth in his head and had never been to a dentist and makes little or no use of a tooth-brush. On the other hand, you will frequently find those whose constant use of antiseptic tooth-washes does little to stay the rapid loss of the entire set. It has even been contended that (*a*) were there no tooth-brushes there would be no more caries than at present, (*b*) tooth-powder is the real cause of the weakness of our teeth and water only should be used, and (*c*) the use of a bristle brush is in the highest degree unnatural and is one of the leading causes of tooth decay! Most other "laws of hygiene" are similarly disputed. The fact of this difference of opinion is mute testimony to the fact that *individual* differences are not less important, probably much more important, than hygienic *conditions*.

Similarly in respect to typhoid or other diseases, what the reaction of the body to any toxin of a parasite or other untoward condition working on the body is, depends, within limits, far more upon the constitution of the individual than upon the chemical composition of the toxin, and the particular untoward condition.

This, then, is the first lesson of modern biology: *Health is, within limits, more a matter of heredity than anything else and*

[1] See Thorndike's "Individuality."

in so far as hygiene fails to take this fact into account it fails to be of high practical value.

Accounting for Individual Differences.—Recognizing then the fundamental importance of individual *differences*, it is for us to account for them. Now, no person who is an agriculturist will deny the importance of good conditions of development upon the matured organism. Proper food, protection from extreme environmental conditions, from competition, from parasites, and from gross accidents, are important for any crop of corn or calves; so it is with man. But if under good culture I fail where my neighbor succeeds I must look to my seed or "strain." His potatoes were rot-resistant; his corn was from a "dry-farming" strain; his hogs were cholera-proof, etc. The agriculturist knows that, given certain fundamental conditions of culture, the difference of yield depends chiefly upon the hereditary nature of the organism. And we shall find that these hereditary qualities so reappear in successive individuals and generations as to warrant us in speaking of this succession of similarly endowed individuals as constituting a "biotype." Individuals, then, are different largely because they belong to different biotypes.

We have next to consider how these differences that distinguish one biotype from another become disseminated throughout the entire population. This is the subject of heredity in its narrow sense. And to understand this subject we must clear our minds of a lot of intellectual rubbish, figures of speech, and mystical ideas. Many persons would say that we inherit traits from our fathers and mothers. Strictly, we do nothing of the sort. It is just as true, in one sense, that a father inherits certain of his qualities from his son. The fact is that neither inherits from the other any more than the youngest leaf on a growing shoot inherits its shape from the next older one. The leaves are alike, to be sure, but they are alike because they inherit in succession from the same common stuff, located in the twig at the tip.

This common stuff we may call the germ plasm. It is because the successive leaves on a twig are developed out of the same germ plasm that they are alike. It is because father and son are developed out of the same germ plasm that they are alike. The case in man is more complicated, however, in that a loss of materials and an addition of other, foreign materials is made to the germ plasm at the initiation of each new individual in the processes called maturation of the germ cell and fertilization or union of gametes, so that strictly the son is only a younger *half*-brother to his father by a different mother. We have got used to thinking of the eggs in the mother as hers. Strictly they are not hers but are merely a part, left behind, of the fertilized egg out of one part of which she developed. The rest was carried in her body, protected, warmed, and fed by that body and put in the way of continuing its history, reaching back to the beginning of life on the globe, provided that "fertilization of the egg" can be secured.

When we think what a history that germ plasm has had, through what billions of accidents of *not* being continued it passed unscathed to the present day; when we consider how its continuation is absolutely determined by our behavior; when we contemplate the wrong that we should do society and the world if, through our neglect, an excellent germ plasm should not be continued for another generation, then we realize dimly the magnitude of the trusteeship that is ours in the care of this germ plasm that we carry. Then we realize the heinousness of the crime of poisoning it with alcohol, or of rendering it impotent through the access of venereal disease, or of preventing its continuation because, forsooth, we don't want to be bothered with the care of the new soma that might arise from it and so continue this germ plasm to the next following generation. The germ plasm belongs to society, to the state, and to injure it or to prevent it from carrying out its manifest destiny, save for eugenical reasons, is to be unfaithful to one's trusteeship, is to commit a crime against

society and the state; and it should be so considered by the state.[1]

Again, strictly, we do not inherit characteristics from the germ plasm. It is only a figure of speech when I say I inherited my nose. There was no nose in the germ plasm. The germ plasm carried some things that determined that I should have such bones and cartilages and connective tissues as give the form to my nose. These materials in the germ plasm we call *determiners;* and it is because of some difference in the determiners for the nose in my germ plasm from the nose determiner of your germ plasm that I have a different form of nose from you. The peculiarity of the nose determiner in my case depends upon certain differentials in the determiner. Noses, then, have their distinguishing *characters* largely, if not chiefly, by virtue of certain differentials in the germ plasm. We have our hereditary peculiarities because of the persistence, through the stream of germ plasm that passes down the generations, of certain differentials.

Environmental Modifications of Determiners.—We inherit, as we have seen, determiners. The determiner is not the characteristic; it must *develop* to produce the characteristic. Now, the course of any development is not definitely predetermined, but depends upon surrounding conditions. Here is where environment plays its important rôle in modifying the development of the determiner. All efforts for care of the pregnant woman, of the expectant mother, all child-feeding, milk-station work, all parental training, all school instruction, religious influences, and cultural conditions in general are brought to bear to secure the best possible development of the determiner of the various elements of the physical, intellectual, and emotional make-up. Good culture can do much to insure the full development of determiners in the

[1] "Original nature comes from original nature: inheritance is from germs to the germs. Long before a man is born, the germ-cells that will thirty years later produce his children are set off apart. They do not come from him as a collection from his total make-up, but from the germs that produced him."
—Thorndike, in "Education," p. 206.

fertilized egg; bad conditions may prevent the full development of determiners; but the best conditions cannot cause to develop in a child any trait the determiner for which is absent, just as rain and sunshine and manures do not cause a plant to arise where no seed has been planted. Here is the clear limit to the power of environment.

The Combinations of Determiners.—Finally, each child is derived from the union of *two* germ plasms—of two bundles of determiners—from two germ cells. In the two bundles that unite there are many determiners that are the same, but there are probably some that are found in one of the germ cells and not in the other. When both germ cells bring to the embryo a determiner for the same trait, the trait may be said to be duplex. When only one germ cell supplies the determiner for a trait, the trait in the developed soma is simplex. If neither parent supplies in his germ cells the determiner for a trait, then the trait does not develop in the offspring.

When the determiners are duplex in the individual, then, when that individual forms his ripe germ cells, every one of them contains the determiner for the trait. When an individual is simplex in this respect, then, when the germ cells are formed in such an individual, half of them possess and half of them lack the determiner. If the individual has acquired from neither parent the determiner for the trait, then in none of the germ cells of that individual will a determiner be found.

This abstract conception may now be illustrated by an example, and I choose that of eye color. (1) When both parents are brown-eyed and belong to brown-eyed stock, so that all of their germ cells carry the determiner for brown iris pigmentation, then all of the children that arise by the union of such germ cells will have the determiner for brown iris pigmentation duplex. (2) If one parent be brown-eyed and of brown-eyed stock, whereas the other is brown-eyed but simplex, then all of the children will have brown eyes but half of them will be duplex and half simplex in this respect. (3) If one of the parents be duplex brown-eyed and

the other blue-eyed, then all of the children will be brown-eyed but simplex. (4) If both parents be simplex brown-eyed, then one in four of the children will be duplex brown-eyed, two simplex brown-eyed, and one in four will be blue-eyed. (5) If one parent be simplex brown-eyed and the other blue-eyed, then half of the offspring will be simplex brown-eyed and half blue-eyed. (6) If both parents be blue-eyed, then all of the children will have blue eyes.

Health and Heredity.—We are now in a position to take up the relation of heredity to health. In treating of this topic I propose first to speak of the relation of heredity (1) to the *physical* development of the child, (2) to the *mental* development, (3) to its *moral* development, (4) to its resistance to *physical* disease, (5) to its resistance to *mental* disease, (6) to *longevity*.[1]

(1) **Physical Development and Heredity.**—That the course of development of the body has a hereditary basis is obvious from a vast number of family histories that have been studied. The methods of inheritance of defects in *physical development* are of three types so far as known. There are defects due to an extra determiner, those due to the absence of some determiner that is typically present, and those that are sex-linked.

(*a*) *Physical Defects Due to an Extra Determiner or Determiners.*—To this category belong certain eye defects. Of these, juvenile cataract is one of the commonest and most important. This consists of a clouding of the lens of the eye and has a pedagogical importance because it interferes greatly with vision and eventually causes practical blindness. This may begin to appear at birth. Nettleship describes the case of a boy who showed a cataract when the eye was first carefully examined, three months after birth. Usually, however, it begins later, at eight, ten, fifteen, or twenty-five years, or even later. If now the family history be studied, it will be found, practically invariably, that one parent of the affected

[1] See Davenport's "Heredity in Relation to Eugenics," and Rosenau's "Preventive Medicine and Hygiene."

child had also cataract in youth, and this can often be traced back for several generations without a break. Unaffected descendants of affected ancestors do not have affected offspring.

Among other eye diseases that fall in the same category are: glaucoma, or the distension of the ball of the eye by excessive production of internal fluids; retinitis pigmentosa (usually), which is a degeneration of the retina that leads to irremediable blindness; and night-blindness, often associated with the foregoing, which makes it hard to see by artificial light.

Imperfections in the development of the male genitalia fall into the category of positive imperfections to development; in extreme conditions the individual is a "hermaphrodite," and may show psychical conditions as ambiguous as his physical. Finally, nearly all abnormalities of fingers and toes seem to belong to this group, including polydactylism, syndactylism ("lobster-claw"), brachydactylism (or two-jointed fingers), double-jointedness of fingers, and crossed or hammer toe. The affected persons tend to reproduce their peculiarity.

(*b*) *Physical Defects Due to the Absence of a Determiner.*—One of the best examples of this class is defect of pigment, as seen in albinos. This condition is usually complete; the spotted condition is rather rare and is properly not albinism, and seems to be inherited as a positive character. When pigment is lacking the hair is, including that of the eyelashes, white; the skin is of a clear, translucent pink; the retina is devoid of pigment, so, as seen through the pupil, the back of the eye looks pink; even the blue of the iris may be absent. Such cases usually arise from consanguineous marriages, because the defect has to be carried in each of the fused germ cells.

In addition to albinism there is some reason for believing that excessive growth in stature, congenital deafness, and cleft palate are developmental defects that are due to the absence of each of one or more determiners; but it must be

admitted that heredity in these cases seems to be complex and has been insufficiently analyzed.

(*c*) *Physical Defects Due to the Absence of a Sex-Linked Determiner.*—Here belongs, first of all, hemophilia, or inability to coagulate the blood after a wound. The so-called "bleeders" are apt to die in consequence of excessive hemorrhages; so that this defect is a very serious one. As in the case of other sex-limited qualities, it is found typically only in males and only such as have unaffected parents, but the trail of the defect can be traced through the female line to some affected male ancestor. No affected male who marries a normal woman has any affected children, but the daughter of such will have half of her sons affected. Atrophy of the optic nerve and multiple sclerosis are other examples of this trait.

(2) **Mental Development and Heredity.**—Heredity plays a great part in the mental development of the child also; typically by the absence of one or more determiners for complete mental development. Thus, there is much evidence that hereditary imbecility is due to the absence of one or more determiners; for two parents of the hereditary-imbecile type have typically, if not always, only offspring of this type. In the same way hereditary epilepsy seems to result from the absence of a single determiner that regulates the centres that control movements. Cerebral palsy of infancy is similarly due to a defect. Finally, color-blindness must be mentioned as a type of the sex-linked characters that belong to this category and whose inheritance follows the same law as hemophilia, mentioned in the last paragraph.

(3) **Moral Development and Heredity.**—Heredity has important relations to moral development. Studies of wayward children have shown that bad temper, especially of the stormy, outbursting kind (tantrums), is clearly dependent on a positive determiner; the trait passes without break from generation to generation. Also extreme eroticism, erotomania, is inherited in similar positive fashion. Many other

elements of wayward, violent, and criminalistic behavior have a clear hereditary basis, even though the exact method of inheritance cannot yet be given.

(4) **Resistance to Disease and Heredity.**—Inheritance of resistance or susceptibility to disease has long been recognized, but since the grand developments in bacteriology the old theory of diathesis (predisposition) has rather fallen into disrepute; but it is now reviving again. Just as the organs of the body are not in the germ plasm as such but merely determiners or differentials of them, so with respect to disease. Susceptibility as opposed to resistance is due to one or more differentials in the germ plasm.

In some cases this susceptibility is due to a positive determiner. Thus the tendency to form fluid-filled vesicles in the skin after the slightest provocation such as a pressure or a scratch (epidermolysis bullosa) is a trait that shows itself in the first month of life and it is strongly hereditary. It is to be noted that the bullæ are not formed without the trauma; they are the reaction of a specially susceptible skin to a slight trauma. Similarly a tendency to chronic jaundice runs in certain families without skipping a generation.

In other cases, and these seem to be commonest of all, the susceptibility is due to an absent determiner. To this class belongs in all probability non-resistance to *tuberculosis*, and to the causes that lead to *catarrh;* here also, almost certainly, susceptibility to *cancer*. Thus lack of resistance plays a rôle of the profoundest importance in some of our worst diseases.

(5) **Resistance to Mental Disease and Heredity.**—In speaking of mental breakdown we are prone to find its cause in some sort of stress, loss of a close relative, disappointment in love, failure in business, etc. But these things happen to many people who do not lose their mental vigor. Those who thus give way have some neural defect, some lack of mental strength. That juvenile dementia is due to an actual lack of some determiner is indicated by its method of inherit-

ance. If both parents be subject to it, all of the children are. There seems to be a little more doubt about the conditions that are classified as manic-depressive.

(6) **Longevity and Heredity.**—That longevity has a hereditary basis cannot be doubted. It is easy to find fraternities, even of large size, nearly all of whose members have lived to be over eighty years of age and in which both parents and at least half of the grandparents had reached the same advanced age. In other families, on the contrary, most if not all are dead by fifty years. We can understand this upon the principle of *inherited resistance to specific diseases.* A body that is resistant to tuberculosis, to catarrh of the respiratory tract, and to cancer passes unscathed through the most dangerous period of beginning decline of the bodily powers.

The foregoing list by no means completes the roll of morbid, or contrariwise healthy, conditions that have a hereditary basis, *but only those whose method of inheritance is best known.* Many, if not most, serious heart troubles that date from early childhood are due to hereditary malformations or bad positions of the heart. Harelip and cleft palate, multiple nipples, hereditary ataxy, Friedrich's disease, amaurotic family idiocy, certain edemas, various disorders of metabolism, rheumatism, migraine, dipsomania, and scores of other conditions have a clear hereditary factor; and, conversely, the absence of these is largely due to some hereditary source of strength and vigor. An early breakdown can usually be attributed to some weakness in the machine.

Eugenics and Health.—The wide-spread absence of physical and mental health in the population is a tremendous handicap to society. Our States spend over $100,000,000 annually in the care of the defectives and the sick, and it may be conjectured that no less a sum is lost privately by illness of one sort and another, due to inherited lack of resistance. Not only is there a huge money loss but a loss of labor of an army of effective persons caring for defectives

who might otherwise be engaged in some constructive work. The consideration of all of these facts has led many persons to urge that attempts be made by education and by state interference to diminish the heavy reproduction of these mental and physical weaklings. This is the practical application of eugenics, which on its theoretical side is largely the study of heredity in man.

While it is recognized that the state, by segregation of those unfit to reproduce, or even by sterilization, may diminish the reproduction of the grossly unfit, many have grave doubts if, by education, anything can be done to influence marriage selection. In this doubt the present writer does not share; and the reason for his optimism is that scores of persons who are thinking of marrying, others who are interested in another, and still others who are so deeply in love that they declare they will die if their love is not satisfied, have written to him to know if the contemplated union will probably result in healthy offspring. And in two cases, at least, on viewing the facts of heredity as displayed by a graphic representation of their own statements, the proposed marriage has been abandoned. These cases were, to be sure, those in which there was home opposition on eugenic grounds and the writer was called upon to act as referee. I mention these facts as justification for my contention that at an early stage in the often *prolonged* process of falling in love proper instruction may avert an impending ill-advised match. One great difficulty has been that our knowledge of the inheritance of traits is wofully deficient.[1]

As an instrument of research in human heredity and eugenics there was founded in October, 1910, by Mrs. E. H. Harriman, at Cold Spring Harbor, Long Island, N. Y., the Eugenics Record Office. This office seeks to fill the need of a clearing-house for data on human heredity, and a place where studies on heredity can be made. This office seeks to

[1] See chapter on "The Hygiene of the High School," in Johnston's "The Modern High School," by the editor.

interest persons in their own family history by distributing, without charge, a schedule called "Record of Family Traits" to those who agree to fill it out for their own family and return it to the office—a second copy being sent to such as desire to retain it for their own use. In this way thousands of persons have had their attention directed to a careful consideration of their own traits and the distribution of these traits throughout their family.

The application of such family histories is very varied. Many teachers have suggested that every pupil on entering a school should bring with him, filled out, such a schedule so that his teachers might have some knowledge of his hereditary background; might have some notion of the probable potentialities that they are to cultivate. Every teacher learns, usually at the end of the semester, about his student's capacities, but it would save much valuable time if he had some inkling of this at the very beginning. A knowledge of the heredity of pupils will, of course, be indispensable in any scientific plan of vocational and hygienic guidance. Similarly the family history would be of great advantage to the gymnasium director in prescribing exercises for any student, and it would be useful in the infirmary in case the student should fall ill. A proper recognition of the facts of hereditary potentialities would be of assistance in all aspects of a student's training.

To facilitate the inquiry as to the desirability of a given marriage from the standpoint of health of the children, the Eugenics Record Office distributes a schedule called "Index to the Germ Plasm," in which may be recorded parallel records of the young man and the young woman. Such a parallel record brings into clear relief the family inheritable traits and enables the expert to say at least something about probable traits of children. The schedule is a somewhat difficult one to fill out, but already scores have been filled out very carefully and served as a basis for a clear statement of probable results of the given combination in so far as the

nature of the germ plasm is truly and fully set forth in the schedule.

By such means, then, the health of the next generation may be made better than that of this—not merely by curing the sick, not merely by following the "rules of hygiene," but by breeding a larger proportion of children who shall be in the less need of the rules of hygiene because their bodies are, by nature, highly resistant to health-destroying agencies.

CHAPTER IV

THE HOME HYGIENE OF CHILDREN

Parents' Health Responsibilities.—In the past it has been a too common habit to lay the blame for the production of many of the physical and mental handicaps of children upon the public schools. A closer study of actual conditions, however, reveals the fact that the home plays a far greater part than the school in the production of such handicaps. Without the close co-operation of home and school little of real value can be developed in the way of improving the health conditions of school-children. In this chapter an attempt will be made to outline those points which parents need to understand to co-operate successfully with the school in the physical improvement of children. Parents greatly need to learn correctly to interpret the rather plain signs of common disorders in children.

There are many significant habits which indicate such disorders, yet these are frequently either quite ignored or misinterpreted. Then the parent must also remember that symptoms of health are at least as important as those of disease, and that many things which to some seem abnormal are merely normal manifestations in the development of the child. Each individual child requires special study, for there is really no such thing as an *average child*.[1] All children are in one sense "exceptional."

Wise parents should not make the common mistake of attributing many symptoms to one cause, but should often look and expect to find several such causes.[2]

[1] See Thorndike's book on "Individuality."

[2] Parents will find much help in Professor Ditman's little one-volume cyclopedia on "Home Hygiene and the Prevention of Disease" (Duffield).

Heredity.—As Doctor Davenport has shown, the matter of heredity is of such paramount importance in any serious study of children that it deserves some discussion before all else, and this is of special interest in respect to a consideration of *nervous children*. Very often the child is blamed both at school and at home for matters which are either the direct or indirect results of heredity and for which the child is little, if at all, responsible.

In the home study of the child, parents can do no better than to commence with a careful consideration of those qualities which they themselves possess. Such an inquiry often unfolds and explains problems which otherwise might remain unexplained, and which would therefore be difficult to correct.

The child is a small *mosaic* of all his ancestors, but particularly of his more immediate ones, and it is of the utmost importance to understand as far as may be just what elements enter into his make-up. Why parents should so frequently ignore the rather plain manifestations of their own undesirable qualities when they appear in their children in a slightly disguised form is a matter hard to comprehend.

"It is difficult to understand," says Doctor Leonard G. Guthrie, "why a subject so important to the welfare of the community as the study of children should have been so long neglected," and one might add that it is still more difficult to understand why a subject so important as the study of *parenthood* suffers from yet greater neglect.

In the schools to-day we hear and see much of the *nervous child*, but how often is it understood that such nervous, and usually irritable, children have in most instances nervous, irritable fathers or mothers? The correction of nervous disorders in children ought often to begin with parents, for even with a bad heredity in this respect much good may be accomplished if the child can be relieved of what is nearly always present under such conditions, namely, an unstable, neurotic home environment. But before parents can successfully study

their own nervous tendencies it is often important to recognize the early nervous manifestations of their children.

Description of the Nervous Child.—Doctor Francis Warner, in his "Study of Children," has briefly described the nervous type of child perhaps better than any one else, when he says:

There is a class of children commonly met with in every community, termed nervous children. Such are apt to complain of headache, are difficult to put to sleep, they talk at night, and grind their teeth, while in the morning they are tired and not ready for breakfast. They are often bright enough mentally, and affectionate in disposition, but they are likely to be irritable, passionate, and too emotional. They are the children who are delicate without having any definite disease; they are rarely laid up with a definite illness but they are not strong; they cannot walk far without getting tired; some days they are too tired to do anything and must rest; capricious in appetite, yet sometimes ravenous, but remaining stationary or increasing slowly in weight.

The general balance of the body, as the child stands, is usually asymmetrical, with the head slightly drooped and inclined to one side; while the spine is perhaps bent a little to one side, with unequal shoulders, and the feet unequally planted.

The eyes wander much, in place of being directed to objects. In the face the expression may be somewhat diminished, with fulness under the eyes indicating *fatigue*.

When the hands are held out in front, asymmetry in balance of the arms is frequent, the left hand usually being held lower. The fingers frequently show twitching movements, if they are held separate from one another so as to be free to move.

In mental habit such children are usually quick in learning, talkative, playful, and often laughing.

In social life they seek one another's company and as they are usually imitative, one may prove a source of mental excitement to another.

On looking further at such a child, you will probably find that the face is the best nourished part of the body. The limbs are thin; the teeth are very likely flattened at their tips from the constant habit of tooth grinding.

These nervous children are *very difficult to feed:* the appetite is either very poor or it is capricious.

We may further add to this accurate description of Doctor Warner's by stating that nervous children are often restless,

inordinately active, busy to no very definite purpose; their emotional natures are often unduly developed, and under very poor control. Laughter and tears are always near the surface. Affection, anger, sorrow, and joy are not very well differentiated. They are inclined to selfishness, fond of attracting attention, quick to give offense, but quicker to resent it in others. At home children of this type are usually very badly disciplined, and indeed such children often furnish a pretty fair index to the character of one or both parents. Such parents probably use very little discretion in matters of discipline. They cannot bear to see the child suffer and consequently, since it rarely meets with resistance, it wishes to have everything it sees. It wants every whim and caprice satisfied. Such a child soon becomes a perfect young tyrant, and he is not only a source of annoyance to others but he defeats his own happiness also, for he never learns the habit of self-control. Most of the neurasthenic adults who go about in the search for *unearned happiness* have passed through a childhood similar to that just described, and indeed we may safely state that their nervous disorder is often largely the direct result of faulty early methods of training. Nervous children need definite and rigid, but at the same time kind, home discipline, and in many instances such training might well begin with one or both parents.

"Such children," says Doctor I. A. Abt, "should be taught to endure pain with some degree of self-control, to respect the rights of others, to obey just commands, to acquire some degree of composure, to live regular lives, to be unselfish, and to love the good, the true, and the just. Particularly high in these qualities is the love of truth. He who is true to himself and others is rarely overtaken with a disorder whose striking characteristics are *exaggeration and dissatisfaction.*"

Environment.—It is a difficult matter always to draw a sharp line between the influences of heredity and those of environment, for such influences are constantly overlapping. Even a child with an originally well-balanced nervous system

may well become irritable and generally unstable through the influence of a bad nervous environment. On the other hand, many a child with a faulty heredity or a distinctly nervous predisposition has developed into a normal life through the influence of a favorable environment. Environment has much to do with deciding the character and stability of the child. It acts every hour of the day, tending to form the habits, lines of acting, and modes of thought.

Parents control the bodies and minds, hearts and souls of their children, not only through hereditary traits handed down from their ancestors, but also by what they themselves do and think.

Example and imitation guide the child in thought and action.[1]

A bad school environment is capable of doing much harm to any child, but the best of school environments can do little to offset the constant and pernicious influence of an unwisely conducted home. It is too much to ask of the school that it *re-educate* a child whose first five or six years of life have run in wrong channels, or that it correct in a few hours each day the influence of daily faulty habits of the home.

Children surrounded day after day by a home environment little or not at all adapted to character formation furnish most of the nervous pupils of our schools.

Some Common Functional Nervous Disorders of Children.—Most of the nervous disorders of children are found in the child of neurotic temperament whose general characteristics have already been described.

These disorders are usually one or more of the following group:

(*a*) Habit spasms.
(*b*) Chorea.
(*c*) Stammering and some other speech defects.
(*d*) Morbid fears.
(*e*) General nervous fatigue.

In a discussion such as this, which of necessity must be

[1] Oppenheim.

strictly limited, it will only be possible very briefly to outline a few of the leading symptoms in each of the groups mentioned, with the expectation that the parent, after recognizing the situation, will seek proper medical aid.

Habit Spasms.—These are characterized by quick, involuntary, peculiar movements. They may be easily recognized by the following description by Guthrie:

> A series of lightning-like blinks or nods or sudden turns of the head aside. The eyebrows may be elevated or corrugated or the upper lids may be raised several times in quick succession, as in a munching rabbit, or the nose may be wrinkled and the nostrils expanded or contracted, whilst half a dozen or more little ineffectual sniffs are produced, or a variety of grunts and queer guttural noises are heard.
>
> The characteristic of all these simple tics is that they suddenly come and go, and each form will commonly give place to another. It is seldom that more than one trick or antic is present at a time. In a more complicated form of habit spasm or tic the child will often perform the most astounding tricks.

Such habit spasms seem often to be a family habit and no doubt usually represent a neurotic family temperament.

Scolding, nagging, or punishment on the part of parents only serves to increase this trouble in a nervous child, and prompt advice should be sought from a competent physician. The habits are usually curable under proper conditions.

Chorea.—Chorea, or St. Vitus's dance, is often confused with habit spasms, and this is most unfortunate, as it is of a much more serious nature.

It ought to be recognized early, but as a matter of fact it is seldom recognized by parents and teachers until it is well advanced.

Any child should be suspected of chorea who has some or all of the following habits:

(*a*) Extreme restlessness.

(*b*) Purposeless motions.

(*c*) Inability to hold pencils, books, knife, fork, etc., securely.

(*d*) Falling down or stumbling easily and frequently.

The spasmodic symptoms include muscular spasms of various parts of the body, such as contortions of the face, jerky movements of the head, shoulders, arms, and legs. In general, the muscular spasms include larger groups of muscles than in habit spasms.

The trouble is often, if not always, closely associated with diseased tonsils and rheumatism, and in many instances the *heart* is affected.

Early and systematic treatment is required, and the child should be removed from school both for his own good and for the good of other pupils, some of whom are very likely to imitate the grimaces and other habits until it becomes a more or less fixed habit on themselves.

Children with this disorder require rest in bed, quiet, regular life, nourishing food, and proper medical treatment.

Stammering and Stuttering.—Stammering, which is caused by a "spasmodic arrest of utterance," and stuttering, which consists in "spasmodic repetition of initial syllables," are both often associated with, if not caused by, a neurotic temperament. The basis of these speech defects lies in "defective nervous control." [1]

Doctor Still states that the determining cause may be some depressing illness, or a shock, or some form of physical irritation. Sometimes it appears after diseases such as scarlet fever, diphtheria, or whooping-cough. Fright may initiate the disorder, and so may an accident. In some cases it apparently originates through *imitation*.

Most children who suffer from these defects of speech are of superior intelligence, and are usually sensitive and of highly organized disposition.

The treatment of speech defects requires special attention unless they are quite mild in nature, and specialists should therefore be consulted.

Above all, it should be remembered that nagging, scolding, or fault-finding in the cases of children who stammer or stutter will produce great injury to the child.

[1] See Bibliography.

As Professor Terman well says, "the stuttering child presents a tragedy to which a majority of teachers and parents are strangely blind, and at home the onset of the disease is a signal for impatience and reproof on the part of parents. The result is often the formation of morbid habits of thought and failure in school work." [1]

Morbid Fears.—Nervous children are rather prone to morbid fears of various sorts, and in some instances these fears cause an intense suffering, little or not at all understood by parents.

Doctor Guthrie well says that the earliest indications of fear should be recognized and should meet with sympathy, encouragement, explanation, and removal of its causes if possible—never with badinage or indifference. Of all emotions, he says, it is the one most calculated to produce lasting effects upon a neurotic child.

These morbid fears include all sorts of things which the child is quite unable to explain. Often through shame he hides his fears until they become almost an obsession or a fixed idea. Many of the "*queer*" habits of children may be explained by these suppressed fears. Sometimes the child is made by them to appear stubborn, or he may develop untruthfulness, embarrassment, or a variety of other peculiarities so often misinterpreted.

Such fears include, among many others, fear of the dark to an extreme degree; fear of sounds such as bells, the wind, whistles, etc.; fear of space, of death, of sickness, of crowds; of future punishment, of stories of a grotesque or otherwise fanciful nature; fear of certain real people, or of witches. Some children develop fears of shadows, of the forest, of water, of lightning, or even of the most common and ordinary kinds of objects. Not infrequently religious fears develop in a sensitive child which fairly paralyze the joy of living. The normal child will not, in fact, be very religious, for religion is

[1] Parents and teachers may well read Terman's "The Hygiene of the School Child," and Hoag and Terman's "Health Work in the Schools."—ED.

to such children something quite beyond their childish comprehension, and something in which they are therefore not much interested. An intense religious zeal in a child, as also in some adults, is in itself a symptom of a nervous disorder, not an evidence of desirable piety.

Corporal punishment is always of doubtful value, but in the case of nervous children, and particularly those with morbid fears, it must be unhesitatingly condemned.

Unnatural remorse for youthful misdemeanors, real or imaginary, is often seen in nervous children, and an "extreme anxiety to be strictly truthful" is again not an evidence of moral rectitude so much as of morbid nervous instability. Worry and apprehension are also sure signs, in children at least, of the neurotic temperament.

In childhood many danger signs of future mental unbalance may often be discovered by those able to interpret them, and through this discovery there may be avoided in many instances not only the neuroses of adults but also actual *insanity*. The *prevention of insanity* is at last coming to interest the public nearly as much as the prevention of other forms of disease.

General Nervous Fatigue.—Fatigue is so common and is produced in such a variety of ways that a full discussion of it at this time is quite impossible. Parents should remember that the normal child does not fatigue easily and that when he does tire he recuperates rapidly after sleep.

The chronically fatigued child needs medical advice. Play and other physical activities are normal to the young and anything more noticeable than ordinary weariness in children calls for careful consideration.

In real cases of fatigue there is an actual poisoning of the central nervous system through the absorption of fatigue poisons.

As Woods Hutchinson says, "whenever the blood is impoverished below a certain degree or becomes loaded with ***fatigue poisons*** or other waste products above a certain point,

then the nervous system proceeds to make itself felt. The practical point is that a fatigued child is a sick child and the cause or causes of such sickness must be discovered."

Sometimes this is worry, or abnormal fears, or it may be due to digestive disorders, or wrong food, or too little sleep, or various forms of nervous overpressure. But whatever the causes are, the child has a right to the protection from future troubles of the same sort which only a careful study of his case will afford.

Common Errors in Children's Diet.[1]—In children of the school age it is very common to notice those who are suffering from some form of malnutrition. Such children usually have the following appearance: they are thin, pale, and nervous; often the lymph glands of the neck are enlarged; sometimes the gums and lining of the eyelids are quite colorless; headache is rather common, and either diarrhea or constipation is the rule. A careful history of such a case will usually bring out the information that the child is very capricious in appetite, that he has acquired fussy food habits; that he is irritable, and perhaps sleeps poorly or at least is restless at night. Not many of such cases have their basis in any very definite disease, although some are tubercular, as would be clearly demonstrated by the proper tests (Von Pirquet and others).

These children are, in the majority of instances, according to the writer's rather extended experience, *neurotic*, and their fussiness about food is only one of many other nervous symptoms.

Careful questioning brings to light the fact that the child will not eat the ordinary vegetables, with perhaps the exception of potato; that he is inordinately fond of sweets; that he abhors fat, with the possible exception of butter. Sometimes, but less often, the child will eat certain vegetables in excess,

[1] In the preparation of this section the writer acknowledges his obligations to Doctor Adele Jaffa and Doctor Langley Porter. See also the chapter on "School Feeding," by Doctor Bryant.

to the exclusion of meat or other forms of *proteids*, and often he will utterly refuse to drink milk. In the main, however, the malnourished school-child is addicted to excessive carbohydrates (starches and sugars), and consequently suffers from *starch indigestion*. This form of intestinal indigestion usually leads to headache, gas formation, diarrhea, or less often constipation. He is really a victim of one form of *auto-intoxication*, or self-poisoning. With the cause or causes once discovered, the cure is often rather easy. It goes without saying that the fault is in many instances the parents' rather than the child's. Faulty food habits have been condoned if not actually encouraged, until the unfortunate child has become a victim of his vicious habits. Neither scolding, nagging, nor persuasion will avail much, but about the only reasonable course to pursue is for the parent to learn what the proper diet is for a child at different ages and then see to it that he gets the diet suited to his needs. *Place the proper foods before the child and then let him eat or go without.* Ordinarily these foods will consist of just what the normal adult members of the family eat, with the exception of tea and coffee.[1] When such a child really *becomes hungry* he will eat good food of the usual varieties. Firm but kind and patient discipline will always be necessary to secure satisfactory results.

Eating between meals is to be discouraged, at least until the child has established normal food habits. But once he has done so, there can be no valid objection to giving him *real food* when he is truly hungry. It must not be forgotten, however, that real food does not consist of candies and other sweets, and that in any case it must be given in reasonable moderation. As for water, neither child nor adult can drink too much, provided only that it is not taken to wash down unmasticated food. The proper mastication of food is a habit which should be acquired very early, but it will usually be observed that most children, malnourished as well as

[1] More than 50 per cent of school-children drink coffee, and often to excess.

others, need definite instruction in this respect. The question will naturally arise at this point as to what is the proper diet for children of different ages. To answer this question adequately would be quite beyond the limitations of this chapter, but as a very general guide the following suggestions are given:

For a Child Four Years Old.—The child is to have not more than three meals a day. Not more than one pint of milk should be given to drink, another pint may be given in the form of junket or custard or milk soup during the day.

Breakfast.—An egg, with some thin slices of bacon; crisp toast and butter; some apple-sauce or stewed fruit or ripe fruit peeled; if the child is constipated, give honey, stewed prunes, or fruit jelly instead of butter on the toast; to replace some of the toast, give such cereals as Force, Shredded Wheat, Triscuit, or Toasted Rice Biscuit.

Midday Meal.—Small portion of broth (veal, mutton, or chicken) or milk soup with vegetables puréed into it; small amount of simply cooked meat, no fried meat; at first, meat should be finely chopped and mixed with baked potato or boiled rice or fine Italian paste, upon which may be put some blood gravy or broth; white fish may be given occasionally; a green vegetable which has been put through a fine sieve, preferably cauliflower, green peas, green beans, spinach, or asparagus tips; crisp crackers or toast with butter. Dessert: plain pudding, or stewed fruit, or junket, or blanc-mange, or plain sponge-cake or stale lady-fingers with fruit juice.

Supper.—Milk soup with some vegetables puréed into it, or some bread and milk, or junket, or custard; occasionally ice-cream may be given if it is of known quality. Milk jelly or egg jelly or fruit jelly made according to the recipe.

Foods for Older Children.—After a child reaches the age of five he may ordinarily eat the same food as adults, if it is well selected, with the exception of tea and coffee.

Desirable foods include: clean milk, *well-cooked* cereals, crisp bacon, fish, broiled steak, soups, soft eggs, thin toast,

bread and butter, corn bread, crackers, fruit of nearly all kinds, both fresh and cooked, especially baked apples and stewed prunes. Fat in some form is absolutely necessary. This is best taken in the form of butter or olive oil. Often it is necessary to disguise the fat in some special palatable form.

Undesirable foods include: fried meats, veal in any form, salt pork, tea, coffee, hot bread, doughnuts and hot cakes (except in strict moderation), all greasy foods, in general all fried foods. Bananas are rather hard to digest unless *baked*. Fruits with many seeds, such as raspberries and blackberries, are not desirable for young children.

Meals consisting of a deficient variety must be avoided, such as coffee and bread, bread and syrup, potato and bread, or meals which include only *starchy foods*. There is no objection to water with meals unless it is used to *wash down* insufficiently masticated food, but iced water is best avoided except in very hot weather.

School-Children.—In considering the question of how best to feed school-children, it must not be forgotten that the period of school life extends over a number of years, and that in the schoolhouse we invariably find children of different stages of growth and development and children with very widely different needs. It would be impossible for any directions, however lengthy, to cover properly or adequately the requirements of all children, even at the same stage of their lives, with their widely varying tastes and idiosyncrasies and their special constitutional tendencies. No diet list, however carefully chosen, could be used with good results for all children of any one age, much less for children of all ages.

The only hope of a proper solution to this many-sided problem lies in creating in the minds of those people who have the catering in charge, an intelligent understanding of the uses of the various foods, and trusting the rest to their discrimination. Many rules of dietetics are only of service when applied by the person who has had experience with

the particular child in question, and possesses a thorough understanding of its special needs. Only wide general principles are universally applicable.

Kinds of Foods.—The scientific principles which underlie the proper selection of foods are few and easily understood. Chemical analysis has shown us that all foods, no matter how simple or how complex they may appear, contain only four classes of materials. Each class has many subdivisions containing an infinite variety of chemical compounds. But nothing has been found that cannot be classified under these four heads. Two of these are mineral matter and water, which are not necessary to consider in our present discussion. That leaves us only two main classes of nutrients to understand and to deal with—the nitrogenous group and the non-nitrogenous.

The question is naturally asked: "Of what use is this classification? In what way does it help?" The answer is at once plain when we consider that these two classes have entirely distinct and separate offices to perform in the body. The protein or nitrogenous group builds tissues—the bones, muscles, nerves, internal organs, etc. It supplies material both for the building of new tissues, as in growth, and for the repair of the old. The non-nitrogenous group furnishes heat to keep the body warm and energy or power with which to perform our work. This material may be stored up in the body for future use in the form of fat, but can never be used to build real or deep tissues. Fat in the body is like coal in the basement, ready to be converted into heat and energy. Our need of it after we have accumulated enough fat to round out our frames is in direct proportion to the weather and to the amount of energy we expend in both voluntary and involuntary functions. The little girl who sits in a warm room and reads and sews does not need as much as her brother who plays ball in the cold winter air.

That brother is the best example of a healthy creature in need of plenty of nourishing food, that we could well find,

especially if he is in his teens. There is every kind of a call for food that could be found under normal conditions. Who else in the family is growing so quickly, who else lengthening out and widening every bond and tissue of the body? The baby of the family may be doing that, but she is not studying or exercising, neither is she under nerve strain. The father may be using his brain in his work and may be under nerve strain, but he is not growing and may not be exercising very much. Rarely indeed do we find a human creature whose demands for food materials are so many and so urgent as those of the boy in his teens.

If the problems involved in the proper feeding of a growing boy be solved *first*, the results may be modified for other children, up and down the line, according to their ages and conditions, and their individual needs. We have come to know a great deal about the food for the first period of rapid growth, that of infancy, since the chemical analysis of mother's milk has furnished us with a perfect model upon which to base our selection of substitutes when the natural food fails us. But the second period, that comes early in the "teens," is not yet so generally understood.

During these years of adolescence, when Nature is making every effort to develop and round out the perfect individual, she needs all the help we can give her. She cannot build if we do not supply her with material, but she can, and often does, build one part at the expense of another. It is a common thing to hear a mother say, with reference to a child, that he "outgrew his strength." Translated, that expression means that the child did not get, or was not able to use, sufficient food material to supply the needs of the entire organism.

It is the second and last chance that Nature has to remedy defects in the constitution, and she makes a desperate effort to accomplish it. The results of improper feeding at this time cannot be easily remedied. It is often a case of "now or never," and the work that is not done in this second formative

period of life may not be done at all. Weak spots in the building will always remain weak spots, and we should not run any risks at this time. Many of the nervous symptoms usually observed during the period of adolescence are not necessary or normal. The nerves suffer from insufficient and improper nourishment, as well as from other wrong and unhygienic conditions, during the early "teens."

The Kind of Food Needed.—When the importance of proper nutrition is once fully realized, the first question asked is: "How can we supply it—what kind of food does the child need?" The answer is very plain. He needs *all kinds*, and in sufficient quantities.

At first glance it may appear that no real directions have been given for the dietary of a growing child. "Feed him everything. He eats everything now." But perhaps a second and more careful glance will disclose errors. True, there is no one great radical change advocated, but it is the accumulation of all the *little things* that makes the real difference. Nature works slowly. In order to help her we, too, must work slowly and patiently with carefully thought-out meals, conscientiously persisted in for years, if we expect to see results. Some apparently *slight* change made in each meal three times a day for three hundred and sixty-five days in the year would make a great difference in the end.

Suppose, for instance, it were decided to add "growing material to the dinner," other than the meat. Suppose the meat soup were replaced occasionally by a bean or pea soup or by one of the various milk soups, and that on other days the potatoes were replaced by rice or macaroni and peas used more frequently than other vegetables, and that on others the pie were replaced by custard or soft home-made candy, would not that alone make considerable difference at the end of the year?

And if for breakfast oatmeal were used instead of wheat or wheat foods, breakfast cheese for those who do not eat meat or eggs, milk or cocoa instead of coffee, milk toast in-

stead of dry toast, etc., would not the sum total of the year's breakfasts count?

The Lunch.—The meal that usually requires the most radical reconstruction is the lunch. Between the children that rush home and swallow a hasty bite of unsuitable material and hasten back for fear of being late, or else to play with the other children, and those who carry a cold lunch composed of food that would not furnish very much nourishment, even if it were not difficult to digest, there remain probably only a small percentage of children whose lunches are suited to their needs. This is a great drawback in many cases, for it is often the one meal where individual requirements can be most easily attended to. To slight one meal out of three is to slight a very large portion of the child's opportunities for nourishment.

The lunch can never be considered alone. It must of necessity depend largely upon what is given for the other meals of the day. It is really not a difficult task to make one meal complementary to the others when the habit of mind is once established. Having acquired a permanent mental picture of the food groups and knowing the special requirements of the child, it becomes an easy matter to arrange a lunch of nourishing materials not supplied by the other meals.

Does he eat heartily of meat at night and perhaps have some for breakfast? The lunch should contain "non-meat protein." Does he prefer the vegetables and dessert at dinner? Give him meat at noon. Do the other members of the family object to oil or fat? See that the growing boy gets peanut butter or mayonnaise sandwiches, etc., for his lunch. Is his breakfast light? His lunch should then be very hearty. Is he tired at dinner-time and sleepy? His most nourishing meal should be at noon. Does he refuse eggs for breakfast? He may relish and digest them well for lunch, and thus it goes. It would be impossible to cover the ground of the various elements involved in the decision.

In general, the lunch, as well as *the other meals*, should be

as simple as possible in order to supply the required nourishment. The work of handling the quantity and kind of food needed to build up the physical frame and keep the organism in good running order is quite enough strain on the digestive organs, without hampering them with unnecessarily complicated or difficult dishes. As a rule, made dishes, fried food, "warmed-overs," smoked and salted meats, thickened gravies, etc., should not often be given, even to the healthy child, and *never* to one whose digestion is weak. Food that is difficult of digestion may often be handled perfectly on occasions, when frequent repetitions would cause disastrous results. It must never be forgotten, in this connection, that "what is one man's meat is another man's poison," and careful observation is the only sure guide.

Main Points of Feeding.—The main points to keep in mind may be summarized as follows:

Be persistent in using foods from each group.

Be sure to use plenty of "growing material" without going to an extreme with meat.

In using meat substitutes remember:

(*a*) That milk is the most valuable one to use if it agrees, and that skim-milk is just as rich in growing materials as whole milk.

(*b*) That eggs come next in order.

(*c*) That nuts must be ground or *very well* chewed in order to be properly digested and assimilated.

(*d*) That soup meat has *all the growing material* left in it, and none of the deleterious elements, and is a cheap and excellent food and can be made into appetizing dishes for breakfast or lunch.

(*e*) That oatmeal, macaroni, rice, and gluten flour have more growing material than potatoes or white flour.

(*f*) That in using nuts, cheese, and beans the question of individual digestion must dictate the choice.

In comparing the prices of the different foods, we should consider the amount of nourishment they contain as well as the price per pound.

Eating between meals should only be allowed where it is prompted by hunger and not by a desire for goodies. Only easily digested foods, as crackers and fruit, etc., should be given at such times.

The nourishment should be fairly well distributed among the three meals, and not crowded mainly into the dinner.

The weekly dietary should contain considerable variety, but the single meal not too great a mixture.

Study the effects of combinations before discarding any food from the diet list.

Never crowd nourishment nor risk indigestible food on occasions of excitement or fatigue.

After indulgence in an unusually heavy or taxing meal see that the next one is unusually simple.

When protein is added to the dinner for the sake of the children, the "grown-ups" may eat less of the meat. The necessity for *careful mastication* is a lesson that children cannot be taught too early.

If, in spite of reasonable food habits, a child remains badly nourished, one must seek for deeper causes, in which the aid of a skilful physician will ordinarily be required. Perhaps the child has a local form of *tuberculosis* or is a sufferer from *malaria* (in malarious countries); perhaps he is suffering from *fatigue*, which again may be caused by a great variety of conditions; or he may have adenoids, or diseased tonsils, or require circumcision. But in most cases careful attention to the bowels, to fresh air, good food, plenty of sleep, to firm discipline and wholesome and *interesting play exercises*, will solve the problem of the malnourished schoolchild.

Ventilation.—It would seem that no particular attention need be called to-day to the necessity for good ventilation in the home. The following figures, however, taken from the writer's personal data, will demonstrate that ventilation has as yet not received the attention it deserves in a great many families.

Of 681 children questioned in fifteen Minnesota cities, 385, or a little over 50 per cent, sleep in unventilated bedrooms. In Chisholm, Minn., of 425 children questioned, 237, or about 50 per cent, confessed to no bedroom ventilation. In another Minnesota city, of 272 children, 176, or about 64 per cent, have no ventilation in the bedroom.

These figures correspond closely with those obtained by the writer in other places. Even in Berkeley, California, where the climate is mild, it appears that about 25 per cent of school-children are denied fresh air at night.

Poor ventilation affects the health not so much because of chemical changes in the air breathed in a close room, but mainly because in such rooms there is abundant opportunity for infection with various contagious diseases. Yet any one who has enjoyed the privilege of sleeping out of doors, or in an open-air room, knows the exhilaration which is sure to follow, and such people invariably notice the ill effects of a sudden change to indoor sleeping. Poor ventilation, in some way not altogether understood, reduces general vitality, as well as resistance to specific infections, but it may be said that these results are due largely to a high degree of humidity and lack of movement of air currents.

It ought not to be necessary to affirm that fresh air, day or night, injures no one, not even the most delicate; that, on the other hand, it is one of the chief remedies for the cure of tuberculosis, pneumonia, neurasthenia, as well as some less definite general disorders.

Headache.—That headache is a common disorder of children is clearly shown by figures taken from the writer's data.

In Owatonna, Minn., 24 per cent of 570 children were found to be sufferers from chronic headache, that is, headache at least as often as two or three times every week, and in many cases every day. In thirteen other Minnesota cities 1,070 children were questioned and of these 23.9 per cent were discovered to have frequent headache.

Other figures give similar results, and it is therefore safe

to say that about one-quarter of the children of school age are afflicted with much headache.

The reasons for this rather serious handicap are not entirely clear, but in the main it may be said that it is usually due to one or more of the following conditions:

(1) Constipation.
(2) Eye-strain.
(3) Poor ventilation of home or school.
(4) Fatigue.
(5) Auto-intoxication or intestinal indigestion.

The main causes once being understood, it is usually not a difficult matter to correct and control them.

Constipation calls for careful inquiry into proper diets, and adequate and abundant use of drinking-water.

Eye-strain calls for a visit to the oculist and the use of properly fitted glasses. Do not patronize opticians for vision examinations.

Bad air should not be tolerated in any home or school in any climate under any conditions.

Fatigue needs careful investigation. The child may be overstrained nervously either at home or at school, and in either case the advice of an intelligent physician will be needed.

Auto-intoxication is ordinarily due to starch-indigestion or other diet errors, or to chronic constipation.

In respect to constipation, one should understand that the use of cathartics except as temporary expedients is to be strictly condemned. Most cases of constipation may be rather easily corrected by the use of a mixed diet including some coarse foods and plenty of water, combined with vigorous exercise. Massage and other special exercises of the abdominal muscles are often useful.

Disorders of the Eyes, Ears, Nose, and Throat.—These disorders are very serious and important, but cannot be given extended discussion. Parents may well consult Terman's "The Hygiene of the School Child" or other good books on these vital topics.

Attention may, however, be called to the fact that frequent sore throat is an almost infallible sign of diseased tonsils; that rheumatism, tonsilitis, and St. Vitus's dance are closely associated; that adenoids cause mouth breathing, crooked teeth, nasal voice, earache and discharge, and even running ear, and deafness; that peculiar postures of the head, red eyes, crossed eyes, painful eyes, and granular lids are often caused by defects of vision. Blurring of the print and double vision are sure indications of serious eye trouble.[1]

The parent should also be reminded that defects of vision require the best skill of a reliable oculist and that the "opticians" are usually very unreliable in their eye work.

The Teeth.—At least 65 per cent of children between five and twelve years of age have seriously defective teeth. Often the proportion is much greater.

Defects of the teeth are not only offensive to the æsthetic sense, but they produce many bad results to the general health both directly and indirectly. It is only necessary to state here that the *first teeth* require just as careful attention as the second, and, what is more important but not as well understood, that decay of the teeth, both first and second, is largely *preventable* by proper hygienic attention. Preventive dentistry is far more important and much less expensive than *corrective dentistry*. Deformities of teeth and jaws should be corrected *early* and not allowed to go uncorrected until the bones of the face are completely developed. This is a point which even some dentists and physicians seem not fully to understand.

Conclusion.—A very great deal of attention is paid by the national and local governments and by farmers everywhere to the proper upbringing of hogs, cattle, horses, sheep, and the like. Millions of dollars are annually spent to promote the health and proper nurture of these domestic brutes,

[1] Teachers will find much help in Cornell's "Health and Medical Inspection of School Children," and in the author's "Health Index of Children," and Hoag and Terman's "Health Work in the Schools."

and a technical science has been developed. Many farmers rear their live stock better than they do their own boys and girls. City parents are about as ignorant. We bespeak for the children the earnest attention and studious care of their parents. The hygiene of children may prove as interesting to learn as bridge whist or the prevention of hog cholera.

CHAPTER V

PUBLIC CO-OPERATION FOR SCHOOL-HEALTH AGENCIES

The Necessity for Public Co-operation.—The reasons for asking public aid in the development of school hygiene arise partly from the conditions under which knowledge is diffused and partly from the nature of our democratic institutions. The discoveries of new applications of scientific principles are first made by individuals, and they spread to other individuals and groups only through the slow process of publication in periodical, pamphlet, or book. The use of vacuum-producing machinery, for example, for the removal of dirt from floors, is a process which was known to a few some time before it reached school officials generally, and doubtless there are some who even yet are not well informed about it. The latest word in ventilation has reached probably only the immediate circles which surround the scientists who are working upon this problem. Since municipal departments do not ordinarily provide facilities for gaining information, school officials are obliged to depend upon outside agencies for much of the data regarding the most recent methods if they would keep abreast of the ever-advancing waves of health knowledge. But this is only a minor occasion for seeking outside co-operation.

The Inertia of Democratic Institutions.—Since among democratic institutions modification of function, theoretically and practically, generally results from the impact of public sentiment, the adoption of new methods must proceed much more slowly in a democracy than it does in a monarchical form of government. But if the knowledge of new

hygiene methods spreads slowly, a process even more dilatory is the assumption of such methods as regular functions by our public institutions. An illustration is found in the case of school medical inspection. In this country its inception took place in Boston in 1894, and in 1911, according to statistics[1] compiled by the Russell Sage Foundation, only 443 cities, or 43 per cent of the 1,038 cities reporting, had adopted medical school inspection. And of the 443 only 102 had put in school nurses, and only 69 were employing school dentists.

Again, boards of education, like other governmental bodies, are not only slow in initiating novel methods but they are also slow in extending them to all parts of the system. For example, many cities have established some open-air schools but few if any have as yet made adequate provision for all the anemic or pre-tubercular children now attending their classes. The explanation is to be found in the fact that boards of education cannot move, even when the legal authority is clear, without adequate funds, and the appropriation of funds is ultimately dependent upon public approval. Since school officials are limited in their power to arouse public sentiment in favor of new machinery, they are obliged to depend upon assistance from outside agencies. These can cooperate both in piecing out the partially adopted activity and in developing the public support necessary to place it upon an entirely adequate basis.

The Service of Criticism.—It sometimes happens that medical inspection which has been long maintained becomes inefficient. The school authorities may suspect the existence of unsatisfactory conditions and yet not have, or be in the position to obtain, the evidence necessary for their correction. Here again is afforded an opportunity for some friendly external organization to carry on an investigation which, because of its foreign auspices, will be considered more impartial than an investigation carried on by the board of education

[1] "Medical Inspection of Schools," Gulick and Ayres, p. 15.

itself. Again, in the administration of hygiene activities overlapping sometimes occurs, and thus a condition is brought about which can be remedied only by a third party. Only under rare circumstances can one department co-ordinate its work with that of another without the intervention of an unbiassed umpire.

Public Co-operation Increasing.—In the early days when leadership in school matters was more largely left in the hands of prominent citizens, often men of learning and standing as educators, the co-operation of outside agencies was not only not sought but even considered meddlesome. With the increasing public concern regarding child welfare, however, and with the development of larger initiative on the part of the school officials themselves, a different order has come about. To-day the school reports from the more enterprising cities are replete with acknowledgments of indebtedness to outside agencies for various kinds of valuable assistance.[1]

The Differentiation of the Public.—For the purposes of this chapter the public is considered to include all those persons and private bodies which are not under the control of the school authorities. This public, to which school officials may look for co-operation, is divided into individuals and voluntary organizations, and it is from the latter bodies that the most efficient help ordinarily comes. The reason for this latter fact is that voluntary organizations represent and give expression to particular interests. In the act of formation itself a selection is automatically made of those individuals who are either specially interested or proficient in the activity for the performance of which the group was originally called together. The voluntary society is, indeed, a tentative variation in the structure of the social organism whereby certain of its elements combine to perform a new function. If this special activity prove to have a preservative value society nourishes it, provides it with bone and sinew, and finally articulates it with its other fixed institutions.

[1] See Cabot's "Volunteer Help to the Schools."

The Varieties of Private Organizations.—When grouped according to function the various voluntary and quasi-public associations to which school officials may resort for health assistance fall into seven fairly distinct classes, although there is considerable overlapping, many bodies carrying on activities which fall into two or three different categories.

(1) The first group is the one upon whose achievements all the others are dependent. It is composed of the organizations which develop new knowledge. Their workers are scientists who are working in the van of advancing civilization. They include such bodies as the Rockefeller Institute, the Carnegie Foundation, United States Bureau of Health Service, faculties of medical colleges, and other associations which are composed of physicians, sanitary engineers, and research specialists in chemistry, physics, and the biological sciences.

(2) The next group is composed of the bodies whose experts develop through statistical methods the facts regarding the existence of disease, the data of which show the need of improved health methods. Such a body is the Committee of One Hundred on National Vitality of the American Association for the Advancement of Science. In this field also the various insurance companies are, through their actuarial departments, doing most important work.

(3) In the third class fall the organizations which investigate the various methods by which scientific principles of hygiene are put into effect. They examine the results obtained under different forms of public administration and make their researches available in published reports. Among the organizations[1] performing this function may be mentioned the National Association for the Study and Prevention of Tuberculosis, the Russell Sage Foundation, the Life Extension Institute, the National Association for the Study and Prevention of Infant Mortality, and the United States Public Health Service.

[1] For a more comprehensive list of these various organizations see "Educational Problems," by G. Stanley Hall, Chapters XI and XII.

(4) Associations for propaganda, which stimulate and direct campaigns for the adoption of hygiene activities, constitute the next class. Some of these have already been named in the preceding category, since they perform both of these functions. A notable instance is to be found in the national and local bodies which are pushing the fight against tuberculosis. Other examples are the Playground and Recreation Association of America, the Woman's Christian Temperance Union, the General Federation of Women's Clubs, National Conference of Charities and Correction, and similar organizations.[1]

(5) The local charitable and philanthropic organizations, medical and dental societies, women's clubs, chambers of commerce, and social settlements indicate the character of the next class. These bodies assist by promoting the establishment of hygiene activities in local institutions and by administrative co-operation in incipient and inadequate systems. They are often the local groups through which the national bodies mentioned in the preceding category perform their work.

(6) Bodies such as the Public Education Association or the Bureau of Municipal Research which do local research work and assist not only in the strengthening of municipal departments but also endeavor to help in the co-ordination of their activities, comprise this group.

(7) The last group is composed of mothers' clubs, parent-teacher societies, ward improvement and taxpayers' associations, and other bodies of citizens which maintain a receptive attitude toward health information. These are the groups through which school authorities and other interested bodies can accomplish a diffusion of health facts so as to develop a supporting environment for the school hygiene activities.

Information about Hygiene Methods.—The task of keeping in touch with the latest school hygiene data is greatly

[1] See Report of the Commissioner of Education, 1912, vol. I, "Typical Health Teaching Agencies of the United States," by F. B. Dresslar, pp. 299–358

facilitated for school officials nowadays, by the vast numbers of bibliographies and the pamphlets of the propagandistic organizations, and the various government bulletins which the libraries are compiling and collecting. The Federal Bureaus of Labor, Education, and Children, and the United States Public Health Service, are constantly sending out pamphlets bearing upon health topics. But the school superintendent has not only to keep himself informed; for the successful carrying out of his plans it is necessary that the members of the board of education and the principals and teachers constituting his staff should likewise be well informed. For this education in health methods within the school system much help can be obtained from various volunteer organizations. Lecturers may be obtained from local medical and dental societies, and the staffs of the various propagandistic organizations working in the health field. Many of these societies have lantern-slides or motion-pictures which can be borrowed for public meetings. The platform discussions may also be supplemented by carefully chosen and tactfully distributed pamphlets.

Information should be sought, however, not only concerning the most improved health methods in other cities, but facts should also be obtained about the sanitary conditions in the superintendent's own system, as without this information thoroughly efficient administration cannot be maintained. These data the superintendent can to a certain degree obtain for himself; it all depends upon the research facilities at his command. Often he is obliged to call upon some outside agency either for assistance in carrying on an investigation or to take entire charge of one. Since in the latter case, through the mere bringing of a voluntary organization into intimate contact with the school system a certain proportion of the outside public is caused to become vitally concerned about school conditions, this topic affords an appropriate transition to the next subject that requires our consideration.

Creating Public Sentiment.—The importance of seeking

aid from outside organizations having a large and influential membership in the task of making sanitary surveys is immediately seen when it is realized that the facts as to bad conditions are of little value unless they can be followed up by administrative changes which will remedy and prevent the recurrence of the objectionable conditions. When the members of the woman's club, for example, go about from school to school filling out a sanitation or other questionnaire, they actually enter the environment in which the children of the community spend a large portion of their days. If this environment is not healthful they are immediately filled with an ardent desire to change it, and thus a vast amount of public sentiment is automatically created and set to spreading.

Miss Elsa Denison's "Helping School Children"—a most suggestive treatment of the whole subject of public co-operation—describes in Chapters VII and VIII many kinds of assistance which women's organizations are rendering school officials. Mention is made of the investigation of the Boston public schools by a branch of the Association of Collegiate Alumnæ, which resulted in the formation of a new school code; also of the survey performed by the Arundell Club in Baltimore, and by the Public Education Association in Providence. The extensive questionnaire used by the New Jersey Federation of Women's Clubs in its State-wide study of school conditions is also set forth.

Getting the Evidence.—In meeting the necessity for concrete, objective evidence, when seeking to bring about extensions or improvements in hygiene activities, school officials have received much assistance from the local medical and dental associations. In Philadelphia Doctor Samuel W. Newmayer developed some data showing the need of the co-operation of school nurses in medical school inspection. His figures[1] show that in the four schools where the inspector

[1] Reported in the Proceedings of the Fifth Annual Congress of the American School Hygiene Association under the title, "Evidence that the School Nurse Pays." These results are also printed in "Medical Inspection of Schools," Gulick and Ayres, pp. 66–67, revised edition.

was assisted by a nurse 89 per cent of the recommendations were acted upon, whereas in an equal number of schools where the medical inspector was unassisted only 24 per cent of the recommendations were followed by action.

In Philadelphia also a very effective argument for dustless cleaning in public schools was developed through a tabulation by months of contagious diseases among children. The evidence was graphically shown by means of various columns proportioned to the respective monthly figures. The very low columns during the summer months, the open-window period, and the overtowering columns of the winter and early spring months when the windows are closed and the dust-carried germs have undisturbed sway, constitute an illuminating lesson. There are few cities where it would be difficult to find some organization or individual who would assist a superintendent by delving into the local vital statistics and compiling a similar table.

During a mouth hygiene campaign in Cleveland directed by national and local dental associations, over 20,000 pupils were examined and in 97 per cent more or less faulty mouths were found. Facts such as these have a convincing power and a publicity value that is never possessed by any single man's convictions or opinions, however well stated or whatever his reputation.

A committee of the Public Education Association of New York City recently employed a specialist to make mental examinations in connection with the work of the ungraded classes in the public schools. On the basis of these examinations a reorganization of this department was effected. Many other instances of this form of co-operation could be adduced.

Publicity for the Facts.—After developing the facts needed to reinforce a request for the introduction or extension of medical inspection, or of any other hygiene activity, a great deal of thought can profitably be given to the best way of causing these facts to reach the public. A very common

method is by means of the superintendent's annual report. A suggestive example is found in the Northampton, Massachusetts, school report for 1912. The superintendent desired a school nurse, and by way of bolstering his argument he mentions some actual cases which came to his attention during a single visit to one school:

> An intelligent parent who does not agree with the head of the Boston dispensary that two-thirds of the so-called physical defects of children are caused directly or indirectly by decayed teeth allows a child to be poisoned by decaying teeth on the theory that the first teeth being temporary do not need any attention; a hard-working mother who does not know what to do to prevent scabies from spreading in her family allows her children to run wild and blames the schools for excluding them; indulgent parents allow a nine-year-old boy to drink six cups of coffee a day, then wonder why he fails to do his work at school and is so nervous that at times he has no self-control; a mother should have her attention called to a vicious habit which a wide-awake teacher has discovered in her eight-year-old boy; a non-English-speaking mother needs help in freeing her children's heads from parasites, as she cannot read the directions sent her from the school.

But, since in school reports health matters must necessarily be mixed with many other topics, an even better method is available when a volunteer agency makes the investigation, and that is to let it publish its own report. Thus the evidence goes before the public in a conspicuous manner and under supposedly impartial auspices. In the inquiries undertaken by the Public Education Association, Bureau of Municipal Research, or the Woman's Club it is customary to publish the results in striking, individual reports.

Exhibiting the Facts.—One of the most effective instruments for developing public-health sentiment employed in recent years is the child-welfare exhibit, and there are many instances where such exhibits have been arranged by women's clubs, local bureaus of municipal research, and other associations. Detailed information upon exhibit methods can be obtained from the Department of Surveys and Exhibits of the

Russell Sage Foundation, the National Child Welfare Exhibit Committee, and the New York Bureau of Municipal Research.

Public Meetings.—In campaigns for open-air schools the services of publicity experts can often be secured from the local society for the prevention of tuberculosis. Through long experience with the problem of awakening the public to active measures against the white plague, the people connected with this organization have worked out very successful methods. Campaigns of considerable effectiveness can also be carried on with the aid of the local woman's club, chamber of commerce, medical associations, and parent-teacher organizations.[1] An instance of the boost to school hygiene that is accomplished through the occasional meeting is found in the informal conference and reception held under the auspices of the Social Science Department of the Peoria (Illinois) Women's Club in honor of Miss Crandall, of New York, who spoke on "New Aspects of Visiting Nurse Work," emphasizing the importance of the public-health nurse. To this conference the department invited the members of the Visiting Nurses' Association, Registered Nurses' Association, the Mothers' Club, and the Teacher and Kindergarten Clubs. Very often through the social-service departments of the local religious denominations, sermons upon the desired topic can be secured in many of the churches.

The Newspapers.—One of the chief values of the public meeting as an instrument for developing public opinion is the publicity which is thereby gained through the newspapers. To meetings at which prominent persons are brought together, both on the platform and in the audience, columns of space will be devoted, which are more valuable than paid advertisements. Likewise, through the judicious appointment of important persons on committees and the reports of meetings of committees, much helpful publicity can be

[1] See "Wider Use of the School Plant," by Perry, Chapter XXI, "Meetings in School Houses." See also Chapter VII.

gained through newspaper accounts. The amount of space devoted to meetings can generally be augmented by a careful preparation for the reporters' needs. If copies of the speaker's address and lists of the committee memberships, and other informative documents, are prepared in advance for the newspaper men, their reports are usually not only longer but also much more accurate.

As indicative of the value which newspaper editors attach to school items, it may be mentioned that in 1911 the Bureau of Municipal Research[1] clipped from twenty newspapers over a thousand news "stories" and editorials on school matters. Many superintendents are now taking advantage of the opportunities afforded by the press in the conscious development of a public sentiment favorable to their special projects. In accordance with a well-thought-out plan they are systematically selecting happenings in the school system in which the public has a legitimate interest and are turning these items over to the reporters. In some cities, when the annual school report is ready the superintendent hands it out to the newspaper men first and helps them to find its most significant portions. If he has adopted a new school policy of broad import, he seeks a personal interview with the editor and endeavors to get the matter put accurately and intelligently before the public. If he has completed an investigation which has revealed some significant and important facts, he turns his material over to some special writer. If a voluntary organization has rendered an important service, he sees that a definite account of it reaches the news columns. By thus facilitating the acquisition of school news on the part of the press he secures not only wide publicity for school matters but also a favorable attitude toward his work on the part of the most influential organ of public opinion.

The Demonstration.—A method of developing influential support which seldom fails is that of the demonstration.

[1] "Outside Co-operation with the Public Schools of Greater New York," by the Bureau of Municipal Research, p. 12.

Medical inspection in the schools of New York City was started in 1897, but during the first five years there was no school nurse. In 1902 nearly 18,000 children were excluded from the schools, and the classes were in some cases so depleted that it was difficult to carry on school work. To meet the serious situation thus created, the Henry Street Nurses' Settlement offered the services of a school nurse for one month. At the end of that time the results of her work were so obviously beneficial that support was immediately gained from educational authorities, the board of health, and the public for the employment of school nurses.[1]

Similarly, in Philadelphia the Visiting Nurses' Society loaned a trained nurse to the city to show the value of this adjunct to medical inspection. Like demonstrations have also been carried on in favor of medical inspection through the co-operation of the local associations of physicians and dentists.

Securing Codes and Regulations.—The proper result to follow revelations concerning insanitary conditions is the passage of measures or the establishment of activities whereby, it is hoped, the repetition of the evils discovered will be avoided in the future. Thus, through the investigation by the Collegiate Alumnæ, already referred to, Boston received a new school code. But the results of an investigation, a survey, an exhibit, or a campaign of publicity will not automatically translate themselves into new regulations. Unless some one follows them up, the public sentiment they arouse will die away without concrete results. There are plenty of publications which describe the best forms of codes to meet the various exigencies in school hygiene, but they do not often give information as to the best way of manipulating the local social forces through the marshalling and concentration of which the passage of the code will be secured. Every resolution, ordinance, code, or statute has to receive the approval of a certain majority, no two members of which have

[1] This first municipal school nurse has written a chapter for this volume.—Ed.

the same view-point, sympathies, or information, but each of whom can be moved by some influence or other, and not a sordid one at that. The problem is to find the effective influence and to bring it to bear at the right time upon the right person. With one individual it will be more evidence of the actual physical need, and in the case of another evidence of the public demand, or the suasion of an influential friend. The skilful superintendent will make a careful canvass of the opinions of the members from whom he is seeking legislation and tabulate the obstacles which stand in the way. He will then deploy the forces at his command with a view to overcoming them, in the same careful way that the general plans a siege of a city. Oftentimes there is to be found in the local civic or philanthropic circles some live secretary who is also something of a political tactician, whose services can be secured for assistance in this work. The school board of Minneapolis called for a commission of local medical men to advise with the board on all questions of school hygiene. This commission prepared a comprehensive report covering all phases of the subject, and has manifested a willingness to remain as a permanent advisory body. There are few localities in which similar co-operation cannot be obtained from public-spirited physicians, dentists, and oculists.

Co-operation in Administration.—The British Board of Education urges local school authorities to secure the utmost possible degree of co-operation from hospitals and clinics in their physical ministrations to pupils; and the same practise is being followed in many places in the United States. When medical inspection is first inaugurated, it often occurs that sufficient funds are not provided to enable the examination of all pupils with adequate frequency or thoroughness, so that outside assistance is still greatly needed. Frequently a school nurse is not provided, or funds will not allow the purchase of the necessary dispensary articles. An open-window schoolroom may be provided but no food or the kind of garments required for fresh-air work during the cold months.

These shortcomings create an opportunity for outside co-operation which is being very generally utilized throughout the country.

From Medical Associations.—Prominent in this kind of co-operation are the county or local medical associations and the public-health association. In Kenosha, Wisconsin, eight physicians connected with the local medical association gave their services for three years in the performance of an annual medical inspection of school-children. In Rochester, New York, the Public Health Association furnishes food and equipment for the open-air school.

Physicians.—Sometimes individual physicians take turns in donating a month's services to the examination of school-children, or nose and throat specialists will co-operate in the running of a clinic for nose and throat operations. In Houston, Texas, the Association of Optics and Aurists co-operated with the local school board in the work of medical inspection. Many instances of this kind are revealed in the current school reports.

Dentists.—The Harvard Dental School gives treatment to pupils at reduced rates, while the dental school connected with Tufts College also receives pupils who are sent to it by school nurses. Dental clinics for the benefit of school-children are maintained also in the Louisville (Kentucky) College of Dentistry, the Homeopathic Dispensary at Orange, New Jersey, and the Memorial Hospital at Pawtucket, Rhode Island. Doubtless there are many other institutions of this sort performing a similar service for school-children.

Even more common are the instances of co-operation afforded by local dental societies. School reports make frequent reference to the inspection, clinical services, and public lectures which are given by members of these organizations. Sometimes the services are free and at other times partly paid. In some instances only the inspection is made, while in others it is followed up with a regular clinical service. The Cincinnati school report for 1912 has a very suggestive

account of the work performed by the Cincinnati Dental Society. Its activities include inspection, maintenance of free clinic, lectures given school-children, parents' clubs and social settlements, and allied organizations. Recently, in connection with the work of the clinic, experimentation has been carried on with a view to showing the different physical and mental results obtained from a class whose members' mouths were kept in hygienic condition and from a class not receiving systematic attention. Again, individual dentists help school authorities by inspection, free treatment to needy pupils, or even monetary contributions to help carry on the work of the school clinic.

Hospitals.—The assistance given by hospitals varies more or less in accordance with the facilities of the institution. That afforded by the Boston hospitals is especially notable. The Massachusetts General Hospital gives medical and surgical attention to poor children for a ten-cent fee. The same service is also offered by the out-patient department of the Massachusetts Homeopathic Hospital, while the Children's Hospital not only furnishes medical treatment for pupils but arranges a course of instruction for school nurses. At the Massachusetts Charitable Eye and Ear Infirmary treatment may be received for a nominal fee, and in addition eye-glasses are supplied and investigations made of the home conditions of afflicted children. The New England Hospital for Women and Children examines children before they are sent out on summer vacations. It also maintains a dispensary service open to pupils. The Boston and the Maverick dispensaries treat children who are sent to them by the school nurses. In the psychopathic department of the Massachusetts State Hospital mental examinations of school-children are carried on. The institutions of many other cities are performing similar services for school-children.

Charitable Societies.—From the provident associations, children's aid societies, and other charitable organizations in the same class a vast amount of co-operation is being received

by the schools in the physical care of children. Eye-glasses and clothing are provided, attention given to special cases reported by the school nurses, and the home conditions inspected and improved. Some organizations give attention to the work of facilitating country or seashore vacations for needy children.

The needs peculiar to crippled children are being attended to by organizations established for their particular benefit. Some of these bodies afford transportation, free meals, or medical and surgical aid to those in attendance at the public schools. Others provide educational facilities for those whose condition debars them from the public schools, and in some instances trained nurses are sent to visit the homes of these unfortunates. Likewise the deaf and the blind are the recipients of the special attentions which they require from another class of institution.

Nursing Associations.—Another source of most valuable co-operation is found in the various nurses' associations. The Instructive Nurses' Association of Boston provides home attention for the particular cases referred to it by school nurses, while the District Nurses' Association of Scranton, Pennsylvania, supervises the instruction of school nurses; and many other associations are loaning nurses to the school department or helping it to demonstrate the need of this most important adjunct to medical school inspection. The co-operation given to the schools in this field is as miscellaneous as it is important.

Settlements.—Reference has already been made to the nurse who was loaned to the New York schools by the Henry Street Nurses' Settlement. This institution now maintains, under the board of education, a class for mental defectives, and also facilitates country vacations and provides milk for undernourished children. Furnishing school nurses, giving health talks to parents, maintaining open-air schools, special clinics for children with uncommon diseases, schools for sick and shut-in children, agitations for more sanitary buildings,

larger playgrounds and more apparatus—these are only samples of the kinds of assistance which settlements throughout the country are rendering school systems.

Tuberculosis Societies.—The national and local associations for the prevention of tuberculosis, as might be expected, are giving valuable aid to the school authorities in the establishment of open-air schools. The pioneer work of the Providence (Rhode Island) school committee in this field was stimulated by a suggestion of the local League for the Suppression of Tuberculosis, and the physicians who composed the committee of this organization assisted in the selection of pupils for the school. In some instances the local tuberculosis association erects the building and becomes a chief supporter of the work; in others it provides the coats, suits, and other portions of the equipment or the meals. Sometimes the society provides lectures on hygiene in the various schools. In addition to this kind of service the Pawtucket (Rhode Island) Society for the Prevention of Tuberculosis presented forty dollars' worth of tooth-brushes and samples of tooth-paste to the school nursing department. The Wisconsin Anti-Tuberculosis Association offered a complete open-air school equipment to the city of that State making the highest per-capita sale of Christmas seals. This equipment was won by Kenosha, as were also the services of a visiting nurse for one month, furnished by the association.

Women's Clubs.—A vast amount of service is being given to the promotion of child welfare by the women's clubs. Active from the outset in the playground propaganda, they are now devoting their efforts to the establishment of school lunches in high and elementary schools, arranging child-welfare exhibits, agitating the establishment of open-air schools, supplementing the equipment of school nurses, and urging the importance of the best methods of medical and sanitary school inspection.

Parent-Teacher Associations.—Still closer to the school are the parent-teacher organizations with their varied activ-

ities and services. Some are maintaining school-lunch departments, others purchasing playground apparatus, or employing home and school visitors, and installing first-aid outfits. The Fathers' and Mothers' Club of Boston maintains a farmhouse for anemic children. These organizations, so dependent upon the school for their existence, generally consider opportunities for co-operation in the light of great privileges.

Oftentimes the local university is in a position to extend valuable co-operation. The Department of Psychology of the University of Cincinnati gave mental examinations to exceptional children, and the University of Pittsburgh is maintaining a similar service. The local railway companies sometimes assist teachers in their instructions concerning the avoidance of accidents by furnishing blotters teaching the results of carelessness in boarding and departing from street-cars. A Safety League in Kenosha, Wisconsin, arranged lectures in the public schools upon the various methods of promoting safety.

Individual Philanthropists.—In the conduct of the Chicago schools for anemic children the board of education supplies the rooms and teachers, while the Elizabeth McCormick Fund provides the extra pay of the physicians and nurses and meets the expense attached to furnishing food and supplying extra clothing and equipment.

The Forsyth Dental Infirmary of Boston, just being opened, will attempt to care for the mouth conditions of all the children of Greater Boston up to sixteen years of age. The institution was founded by two brothers as a family memorial. The benefactors purchased the site, erected the building, which cost $250,000, and have endowed the holding corporation with a maintenance fund of about $1,000,000. The institution has facilities for sixty-four chairs, and auxiliary room for forty-four additional ones. It is expected that it will be possible to treat over seven hundred cases daily.

The application of philanthropic funds to the field of

school hygiene is, according to the signs of the times, likely to show still further extension.

Assistance in Bringing about Co-ordination.—This sort of service is illustrated in the work of the Public Education Association of the City of New York. It brought together representatives of the departments of Health, Charities, Education, and the Children's Court, as well as a number of private citizens, in a special committee devoted to the promotion of child welfare. The purpose of this body was to develop intelligent co-operation between these different departments, to define the problems of school hygiene, and to carry on intensive studies of some of the more difficult ones. A member of the association staff was assigned to the work of this committee.

Encouraging Voluntary Assistance.—The Boston report for 1913 devotes twenty pages of fine type to a concise statement of the one hundred and twelve organizations which are co-operating with the public schools of that city. Many of the current school reports are also stating the needs of the schools, which would afford opportunities for volunteer co-operation. Thus by inviting co-operation and giving accurate credit for the work that is done, the welfare of school-children is being more rapidly advanced than is possible through the unaided activities of present school systems.

Educating the Home and the Public in Health Practises.—In order that the school's hygiene activities may find support in the pupils' home and neighborhood environment, it is necessary that much miscellaneous health instruction be provided for the community which is outside of the school-building. And in this work the volunteer associations also are unusually helpful. The Public Education Association of Philadelphia prepared and distributed through the school-children ten thousand cards of health instructions to parents. It also prepared and printed an equal number of highly effective pamphlets on the care of the baby for distribution among parents. The regular programmes of the various

parent-teacher associations are full of illustrated lectures upon health topics. The women's clubs also arrange public meetings which are addressed by local physicians, dentists, and school inspectors. The Social Welfare Committee of the South Bend Chamber of Commerce arranges addresses upon health subjects before social-centre audiences in the public schools; while the Commercial Club, of Louisville, Kentucky, in one year spent $6,000 on publicity work in behalf of the schools. Such associations as the Woman's Christian Temperance Union and the Anti-Cigarette League are always ready to avail themselves of opportunities to give public lectures upon their causes before schoolhouse audiences. The Boston Milk and Baby Association not only lectures upon its work before pupils but conducts "little mothers'" classes in the high schools. In Chicago the Visiting Nurses' Association arranged a series of lectures[1] upon intestinal diseases in connection with the vacation schools, to which mothers were admitted as well as high and grammar school pupils. Many other examples of volunteer aid in the work of spreading the knowledge of health facts among the people in general might be brought forward if space permitted.

The instances which have been set forth in this chapter illustrate but do not at all completely enumerate the various ways in which outside organizations are in many places already co-operating, and in others stand ready to co-operate, with the educational authorities in promoting a steady advance in school hygiene. So freely and bountifully, indeed, have the voluntary associations devoted means and personal service to human welfare that, in the light of their deeds, a new meaning now seems to shine forth—especially for all guardians of children—from that old scriptural saying, once rusted over with triteness: "Ask and ye shall receive."

The following summarized suggestions by Wm. H. Allen, in his "Woman's Part in Government," are pertinent:

[1] See "Wider Use of the School Plant," by Perry, p. 142.

The following first steps are suggested to local schools wishing to increase their power for civic education:

1. Ask for a State law on *medical examination* of all children, teachers, janitors, buildings, and grounds in all school districts, *public, parochial, private, rural, and urban.*

2. Teach *personal hygiene* by relating it to community hygiene.

3. Keep your communities continuously informed in regard to *health needs* indexed at school.

4. Realize that every *parent interested* adds a teacher to your staff.

5. Give your *newspapers school stories* and thus add 25 per cent to the efficiency of your teaching staff.

6. Make private agencies supplement school work, instead of supplementing their work.

7. Make your schools the centre of social-settlement work and uplift work in your communities.

8. Recognize that it is just as educational to interest the board of education and the voluntary visiting committee as to instruct a child.

9. Provide for civic and health work by your school organizations.

10. Take advantage of budget season *to tell* 100 *per cent of school and health needs* and to interest 100 per cent of your community in that story.

11. *Welcome* complaints and questions as opportunities for civic education.

12. *Make more demands upon your State department of education* and give it better support.

13. Write your congressmen and senators to give the *United States Bureau of Education* enough work and enough money.

14. Co-operate with the National Education Association's special committee on uniform and adequate records and reports.

CHAPTER VI

THE SOCIAL CENTRE AND EDUCATIONAL HYGIENE

The Situation.—Sisyphus had to keep on rolling at the stone, even though he could not succeed. He had to keep on, or otherwise it would have rolled back and crushed him. And just so we must keep on spending our force in and through the public-school system *as it is to-day* in pressing back the forces of disease and death in the programme of educational hygiene. We cannot stop using the means we have, for we, too, are laboring for our lives.

But, away back when first I heard of Sisyphus, I wondered why he did not hold the stone with one hand and shoulder and with the other hand or with his foot place a cobble under it, or somehow reach around and rig a block and tackle at the back of the stone by which his labor might be accomplished. Had he been able to do that, he would not only have succeeded in his undertaking, but he would, so far, have spoiled and transformed Hades. The social-centre movement, the full use of the common-school system as the machinery of adult and older-youth civic, industrial, recreational organization and co-operation, is the rigging of the block and tackle around behind the stone—the means by which the otherwise futile and discouraging enterprise of radically promoting public health through the agency of the public-school system shall become an achieving enterprise, whose process will go far toward transforming our inferno.

Our experience in trying to make of the common-school system as it is—used one-third of the time, by only the one-third of us who are children, for the mere one-third of the educational process, which consists of children's instruction

—an effective and dynamic agency for the promotion of children's health, seems to necessitate this statement:

The common-school system, as at present manned (or rather womaned), as at present housed (or rather barned), as at present stunted, fails, and is likely to keep on failing, to be greatly, radically promotive of even the children's health.

On the other hand, the experiments in social-centre development, even the little timid experiments that have been made thus far, justify this statement:

When the characteristic community-building-and-yard equipment of America has ceased to be merely the children's school system, and has come to be really the *public*-school system, in use as well as in ownership, it will be the adequate machinery of public-health advance and so will make the health service of the children efficient.

Two Factors.—There are two necessary things to be done in order to make the public-school system an effective agency for health promotion. In the first place, the school must be radically improved in the character of its educational staff, in the character of its physical equipment, and in its curriculum. In the second place, the problem of sociological adjustment, political, industrial, and recreational, must be dealt with.

To-day the profession of the public-school man or woman is a third-rate profession. The salary standard is third-rate, and, in general, the professional calibre of the men and women employed in public-school service is one-third of what it should be. What is true of the personnel of the public-school service is in general true of the housing, grounding, and equipment of this characteristic American institution. And, judged by a standard of vital practical, economical, and constructive arrangement of physical and mental activity of children in the public schools, the curriculum is not more than a third as good as it should be.

What is the answer? "More money for the public schools," says President Eliot. Yes, but how are we going to get it?

There are other needs for the improvement of the public schools to the point where they will be efficient agencies in the promotion of health, other needs than money. How are these to be satisfied?

The longest way round is often the shortest way home, and the problem of making the public school an efficient agency for health promotion is to be solved most directly by coming at it indirectly.

Political Beginning.—The beginning of social-centre development is political. Whether our objective be citizenship-training improvement, moral-training improvement, industrial-training improvement, or health-promoting improvement in the efficiency of the public schools, the first step is the same. It is the shifting of the voting apparatus into the public schoolhouse. It is the use of the public schoolhouse as the polling-place of its district.

The reason for this is not chiefly its economy, great as that is; it is because the establishment of the voting headquarters in the school building makes of this building in actual practise a public place of assembly and organization. The "public" school as a juvenile instructional institution is not now, in practise, a common place of public assembling even as the public is represented in the children. There are parochial schools. But there is no parochial ballot-box. And when the ballot-box is established in the schoolhouse, the fact is declared and realized that this is a common building, a centre of *public* organization and expression.

See some of the immediate practical results of using the schoolhouse as the polling-place, results having to do with the improvement of this institution on lines of public-health service.

Voting in the schoolhouse implies making the school principal the voting clerk of the district. He or she is at once brought into official direct contact with the adults of the community. This added function implies some increase in salary and increase in dignity and influence. The building is

soiled by its use for voting, and the splendid Emersonian principle that "things are good if they are only bad enough" is, as Health Officer George W. Goler, of Rochester, has said, brought into play. The building was dirty as a result of the children's use, but it wasn't dirty enough to necessitate thorough cleaning and renovating. Its use as a polling-place points this necessity, and the result is that the building is cleaned. The citizens of the district coming to the schoolhouse see its architectural ugliness and its poverty of equipment; and its use as a polling-place, the real headquarters of government in a democracy, tends to its improved architecture. The vitalizing influence of this use of the school building for the primary expression of citizenship upon the civic training of the children is obvious and fundamental in its importance.

Deliberative Associations.—The *next* step in social-centre development is the organization of the citizens of each district whose names are recorded upon the voting register at the polling-place, now established in the schoolhouse, into a deliberative association to use the school building as the district common-council chamber, the headquarters of presentation and discussion of public questions. This implies the service of the school principal or of an associate as the district clerk or secretary of the citizenship in its assembling for discussion. The school man, hitherto a man among women and children, becomes a man among men; the agent of the citizenship in the instruction of the children comes to be fortified in his influence by his relationship of direct service under the citizenship as the civic secretary. And a more present-minded, capable man or woman is made necessary for this position. The schoolhouse becomes the place of frequent assembling of the adults of the neighborhood. As such its architectural character and its physical equipment depend not only upon the generosity but upon the self-interest of the citizens. The organizing of contemporary public problems into a curriculum of self-education through discussion by the

citizens, sets a vitalizing standard of government-in-action to which the civic training of the children becomes a real apprenticeship.

Self-Government Clubs.—Then comes the organization of the boys of the community, the boys between school age and majority, into a self-governing club, modelled upon, or rather patterned after, the adult civic organization. This implies the companionship of a club director, which work becomes a function of the school principal or of a member of his staff. It implies the interest of another great section of the community, the youth, who may be counted upon always to favor improvement—their interest and ambition for better architecture and equipment. And the connection between the children and the adults, the connection between apprenticeship and the actual practise of citizenship, is made and strongly made for the children by setting before them, in the practise of the older boys, training in self-government.

What is true of this provision of the schoolhouse as the assembling-place of the boys who are above school age but have not yet reached twenty-one, as to its need and value, is true of its use as the meeting-place of the neighborhood club of girls between school age and adulthood.

Incidentally, this use of the schoolhouse as the club-house for the older boys and for the older girls of the district provides the machinery and the opportunity for their instruction in matters appropriate to their age, matters particularly of public health and personal hygiene.

Weekly Meetings.—Next comes the use of the schoolhouse as the weekly gathering-place for general neighborhood assembling. With one evening in the week devoted to the gathering of citizens for presentation and discussion of public questions, one evening centred upon the boys' club meeting, one evening given up to the girls' club meeting, and along with these an evening when old and young gather for a programme which begins with the orchestral music provided by the neighborhood orchestra that is bound to get itself

formed to meet this need, and then a half-hour of communal singing and then a lecture or entertainment or motion-picture exhibition, closing with an hour's dancing of young people and older people together, with ideal, homelike chaperonage, the basic organization for social-centre development is completed.

Obviously for the arrangement and promotion of such general neighborhood evenings the service of a member of the school staff, whether the school principal or an associate, is necessary, and obviously the inclusion of this function in the office of school man or school woman means the socializing and warming and elevating of that office. Obviously, also, it tends powerfully toward the improvement of the architecture and equipment of the building, for this improvement becomes a matter of citizenship self-interest instead of depending merely upon generosity. And plainly this use of the schoolhouse as a centre of neighborhood assembling and attraction will tend to influence, to vitalize, and humanize the curriculum of the children's instruction there.

The Social Centre as a Health Agency.—The machinery is now established for attacking the problem of public health and all other public problems after a constructive and democratic fashion.

In the forum of the citizens, the imperative need of providing physical-training opportunities for the community is set forth. The outcome is almost sure to be the equipping of the schoolhouse and the school-grounds with gymnasia indoors and out, and with bathing facilities.

If medical, dental, and optical service has not already begun in the school, the matter of its introduction becomes a natural next-thing-to-do, for the use of the schoolhouse as the local health office makes a twofold appeal. On the one hand, those who are interested particularly in the public-health movement see the opportunity that is offered to get at the *whole* community through having health service and health instruction centred there; and, on the other hand,

the opportunity of co-operatively providing for the community's health makes its appeal not only to the parental interest but to the selfishness of the citizens.

And not only is the machinery provided for redeeming the medical and pharmaceutical profession of the country by identifying the physician's service with education, and so realizing the true meaning of "doctor" (which is not pill-counter, nor coddler, nor bill-collection worrier, but *teacher*); but the machinery is provided for attacking the roots of individual and social disease in political corruption, economic maladjustment, and leisure-time exploitation—and so adequately and effectively dealing with the problem of public health.[1]

"The Heart of It."—Of the effective pioneers of the public health movement, the one whose memory is most revered in Wisconsin is Frank Avery Hutchins, founder and first secretary of the Wisconsin Anti-Tuberculosis Association, founder and first secretary of the State Free Library Commission, organizer and, until his death, secretary of the Department of Public Discussion in the University Extension Division. The last words of this clear-eyed constructing engineer of Wisconsin's machinery for social and individual self-enlightenment were spoken in response to the news, brought to his bedside, of the establishment of the schoolhouse as the polling place and community centre, and the appointment of the school principal as community secretary, in one of the small towns of the State. His words, whispered with the utmost difficulty, but with a note of profound gladness, were: "That goes to the heart of it." To him "it" meant the tremendous problem of making the public whole—which is the problem of public health.

[1] See Ward's "The Social Center" (Appleton).

PART II

THE ADMINISTRATION OF EDUCATIONAL HYGIENE

CHAPTER VII

THE INITIATION OF A SYSTEM OF EDUCATIONAL HYGIENE IN A SCHOOL SYSTEM

Including a School-Health Survey

Public Opinion Basis for Public-School Progress.—All the principles of pedagogy, social psychology, and politics, in the best sense, figure in the initiation of any or all of the phases of educational hygiene in a school system. The prejudices, enthusiasms, and social peculiarities of the community, or state, must be taken into thoughtful consideration. The superintendent must study the people he is to bring up to a higher standard of personal and public hygiene, at least as carefully as the teacher must study the children she is to educate. Public opinion is not a thing to scorn or to disregard, and it is likewise not a thing impossible to build up, guide, and make effective in the promotion of the public good. We must not thrust educational innovations upon people without first helping them to feel the need of them. It is far better that through skilful indirect guidance they may be led to demand and to work for needed improvements than that they get them by imperial fiat from the superintendent's office or mayor's chair. Here is where probably most superintendents fail and where all real leaders of the people succeed. The latter know how to create and to guide the specific form of desirable public opinion, thus promoting

the self-activity of the community, while the latter work at the school as if the school system were in a world of its own and the only function of the community were to furnish the children and the money, especially the latter.

David Starr Jordan says somewhere that years ago in southern Indiana he came upon the track of a man's influence on a community that was as clear and as unmistakable as the footprint of a mastodon in the fossil-bearing rock. This man had long since passed on, but he had lifted the community to higher levels and standards, and had given to it an ineffaceable impress. This man probably knew very well in a practical way plain folk psychology, the methods of rousing public sentiment, of developing this into specific public opinion, and of guiding this onward to public demand and public action, including all the factors of local leadership and availability of special groups. Some one should collect from the experience of thousands of teachers and superintendents, as well as from the various men and agencies that have been successful or unsuccessful in the moulding of public opinion, the data which when sifted would put into the hands of school people a set of principles, richly illustrated, setting forth the guiding lines for success in this field. Its relative worth in school-administration courses would be very high. We wish here to outline on an empirical basis a plan for taking the steps toward school-health progress.

Steps Toward School-Health Progress

(1) **Getting Informed.**—The superintendent should inform himself thoroughly on the principles of the work and on what other communities are doing. For this he will need some of the best books and pamphlets and a number of school-health reports, giving particular attention to cities or regions about the same size or smaller than his own. From a pamphlet published by the Sage Foundation he can learn of the cities and towns with populations near his own in size that

are doing superior work in this field. The reports of the national boards of education of England (Whitehall, London) and Scotland (Edinburgh) are always valuable and suggestive, and many cities and rural regions that are doing able health work can be located by their use, and the local reports, say of Bradford, Cambridge, or Dunfermline, may be obtained.

(2) **Interesting the Teachers.**—Next get the teachers with you by principals' and teachers' meetings, if your system is so large. Rural teachers in non-consolidated schools will start directly with the children and people of the community, as described in Carney's "Country Life and the Country School." Teachers may be led to procure good school-health handbooks to use in reading-circle meetings at the buildings. There may be talks by principals, supervisors, superintendents, doctors, nurses, or other specialists. Further steps in disclosing the local health situation in each teacher's room will readily bring, in most cases, enthusiastic response.

(3) **Using the Newspapers.**—About this time newspaper work may well begin, if not earlier. The superintendent should see the editors and talk over the health needs of the schools and the thing he is trying to accomplish. By interviews, articles, quotations from papers, magazines, and books, by pictures of conditions both from other places and the locality, by stories of the findings of the doctors and nurses when they begin their work or the findings of the teachers when they make their preliminary surveys, much interesting material may be used to get the people to thinking along school-health lines and to see to what desirable standards their own community should advance. If superintendents and editors were as skilful as certain advertisers of chewing-gums and safety razors, not to mention other enterprises, the health movement in our country would be vastly accelerated.

(4) **School-Health Survey by School Officials.**—When the teachers realize the importance of more attention to the health problem of the schools and community, it is time to show them how to do something. Doctor Hoag says in a

bulletin of the United States Bureau of Education (555) that teachers can without much previous training, but with the help of certain detailed directions, diagnose or discover 90 per cent of the ailments of school-children. The Ohio School Survey shows that there are a few limitations to this generalization, but that teachers can pick out most of the flagrant cases is well demonstrated. I would advise here, then, a school-health survey, or census, made by teachers, principals, and superintendents, with perhaps some voluntary outside assistance. This survey should include: Medical Supervision, School Sanitation, Physical Education, and the Teaching of Hygiene, and perhaps the Hygiene of Methods, or Instruction.[1]

(*a*) *Medical Supervision.*—Use here Doctor Hoag's form for this purpose as given below and published in the bulletin (555) above mentioned, and printed separately[2] as an inexpensive folder for the use of schools. The bulletin mentioned may be had from the superintendent of documents, Government Printing Office, Washington, D. C. Doctor Hoag's Diagnostic Chart for teachers, given in his "Health Index of Children" and in "Health Work in the Schools," is also valuable for daily use after the survey is over. Snellen test charts may be used for vision tests, and principals or superintendents may even use the Binet-Simon tests for intelligence for a few selected pupils. When each child has been studied by teachers and principals from the health standpoint in this way, the results as summarized may well be published. Voluntary physicians, dentists, oculists, psychologists, and neurologists may be called in to verify any unusual or serious findings. The parents of children found defective should be notified and requested to go to their family physician, specialist, or dispensary, to have the teachers' findings checked up, and the ailments, if any, treated and cured. It is well to be cautious and conservative here, in

[1] Doctor Wood's pamphlet on "Health and Education" (University of Chicago Press) will be found very suggestive for each of these five divisions.

[2] By Whitaker and Ray-Wiggin Co., San Francisco, Cal.

order that real ailments and defects may be reported, so the confidence of the parents may be built up, not shattered. If the voluntary work by specialists, as above suggested, may be brought in to confirm and to modify the teachers' reports, it will be still better. Doctor Hoag's form is here inserted:

AN OUTLINE FOR THE HEALTH GRADING OF THE SCHOOL-CHILD[1]

BY

DR. ERNEST BRYANT HOAG

CHILD-STUDY SPECIALIST, LOS ANGELES, CAL., FORMERLY SPECIAL DIRECTOR OF SCHOOL HYGIENE, MINNESOTA STATE BOARD OF HEALTH

School.....Date.....
Pupil's name.....Grade.....
Teacher's name.....
Town or city.....

HEALTH GRADING OF THE SCHOOL-CHILD

(For Teachers or School Nurses)

DIRECTIONS FOR USE

This plan for the health grading of school-children consists of two parts:

1. An outline for a partial HEALTH SURVEY to be made with the aid of the pupils themselves, or, in the case of young pupils, with the aid of parents.

2. An outline for a more extensive HEALTH SURVEY on the part of teachers.

In schools where a medical officer or nurse is employed this outline will serve as a useful preliminary health survey.

With the employment of this survey no school need wait for the appointment of a medical officer or nurse before commencing some effective health work with school-children.

It is desirable that the teacher should, in the absence of medical officer or nurse, make this survey as early as possible after the children enter school, but if necessary the teacher may take her own

[1] A four-leaf folder for each child.

time and complete the survey of the children in her room at her own convenience.

It is desirable that this survey be made in the case of every child, but in any event the teacher should make it in the case of every pupil whom she suspects of being mentally or physically unsound.

The answers obtained to any one question may be of no particular significance, but the answers taken as a whole will be of very great significance. The answers to questions in the same group are often of great importance. For example, it may be discovered that a pupil complains of headache, blurred vision, and inability to see easily what is written on the board. In such a case the pupil is unquestionably suffering from a more or less serious eye defect. Or, again, it may be noted that the pupil complains of earache, running ear, and perhaps inability to hear easily what the teacher says. Such a group of significant points would indicate unquestionable ear disease leading to permanent deafness. A peculiar standing posture may indicate any one of a number of things, for example, spinal disease, weak muscles, beginning hip-joint disease, etc.

The teacher is strongly recommended to make these surveys without attracting the attention of the individual pupil too much to the fact that he is under observation. The teacher will soon discover that her powers of observation in matters pertaining to the pupils' health will be greatly increased and her attention will be called to many things of importance which she formerly entirely overlooked. As a matter of fact, one of the most important uses of this health survey consists in the fact that it trains the teacher's powers of observation.

When one or more conditions are discovered by the use of this survey, which in the opinion of the teacher require attention from the family physician, specialist, or dentist, a notice should be sent to the parents in the following form:

Date.....

Notice to Parents or Guardians:

.....appears to the teacher to be in need of

.....attention. A further examination by your family physician, dentist, or specialist, is advised.

.....

Principal.

.....

School.

The parent will please sign here and return the notice to the principal.

.....

HEALTH SURVEY

Part I

(Questions to be answered by Pupil or Parent)

Name.....School.....

Date.....Grade.....

Question 1. How old are you?
Answer: .....

Question 2. Have you ever had much sickness? Yes No
Answer: .....

Question 3. Are you well now?
Answer: .....

Question 4. Do you eat breakfast every day?
Answer: .....

Question 5. Do you eat dinner every day?
Answer: .....

Question 6. Do you drink coffee?
Answer: .....

Question 7. Do you drink tea?
Answer: .....

Question 8. Do you have your bedroom window open or shut at night?
Answer: .....

Question 9. Have you ever been to a dentist?
Answer: .....

Question 10. Do you own a tooth-brush?
Answer: .....

Question 11. Do you use a tooth-brush?
Answer: .....

Question 12. Do you have headache often?
Answer: .....

Question 13. Can you read easily what is written on the blackboard?
Answer: .....

Question 14. Does the print blur in your book?
Answer: .....

Question 15. Do your eyes trouble you in any way?
Answer: .....

Question 16. Do you often have earache?
Answer: .....

Question 17. Do your ears ever run?
Answer: .....

Question 18. Can you hear easily what the teacher says?
Answer: .....
Question 19. Is it hard for you to breathe through your nose?
Answer: .....
Question 20. Do you have sore throat often?
Answer: .....
Question 21. Do you tire easily in school?
Answer: .....
Question 22. Do you work any out of school hours?
Answer: .....
Question 23. What kind of work?
Answer: .....
Question 24. How much?
Answer: .....

HEALTH SURVEY

PART II

(Questions to be answered by the Teacher) [1]

	A. GENERAL APPEARANCE	Yes	No
1.	Is the child healthy-appearing?		
2.	Is his color good?		
3.	Is he physically well developed?		
4.	Is he free from apparent deformities?		
5.	Has he a good standing posture?		
6.	Has he a good sitting posture?		
7.	Are the shoulders even?		
8.	Does the child walk normally?		
9.	Are the heels of the shoes worn evenly?		
10.	Is the physiological age of the child apparently equal to his actual age?		
	B. MENTAL CONDITIONS		
1.	Is the child normally advanced in school?		
2.	Is he mentally alert?		
3.	Does he answer ordinary questions intelligently?		
4.	Does he play normally?		
	C. NERVOUS CONDITIONS		
1.	Is the child good-tempered?		
2.	Is he free from abnormal emotion?		

[1] Indicate answers by a check mark.
Answer as many questions as possible.

		Yes	No
3.	Does he have good powers of muscular co-ordination?		
4.	Is the child free from spasmodic movements?		
5.	Is he free from the nail-biting habit?		
6.	Does he speak without stammering?		
7.	Is he free from pronounced peculiarities such as irritability, timidity, embarrassment, cruelty, moroseness, fits, general misbehavior, etc.?		
8.	Is he apparently free from bad sexual habits?		
9.	Is he free from so-called "bladder trouble" (requests to "go out")?		
10.	Is he usually free from headache?		

D. Teeth

1.	Are the teeth clean-looking?		
2.	Are the teeth sound-looking?		
3.	Are the six-year molars in good condition?		
4.	Has the child been to a dentist within six months?		
5.	Are the teeth regular?		
6.	Does the child use a tooth-brush every day?		
7.	Are the gums free from abscesses?		
8.	Are the gums healthy-looking?		
9.	Are the upper teeth straight (not prominent)?		
10.	Have decayed teeth been filled?		

E. Nose and Throat

1.	Does the child breathe with the mouth closed?		
2.	Is he free from chronic nasal discharge?		
3.	Is he free from "nasal voice"?		
4.	Has he a well-developed face?		
5.	Has he a well-developed chin?		
6.	Has he straight, even teeth?		
7.	Is the child mentally alert?		
8.	Is he usually free from sore throat?		
9.	Is the hearing good?		

F. Ears

1.	Does the child usually answer questions without first saying "What"?		
2.	Is he fairly attentive?		
3.	Is he fairly bright-appearing (not stupid)?		

		Yes	No
4.	Does he have a voice with good expression (not expressionless)?	.....	.....
5.	Does he spell fairly well?	.....	.....
6.	Does he read fairly well?	.....	.....
7.	Is he free from complaints of earache?	.....	.....
8.	Is he free from ear discharge?	.....	.....
9.	Is he free from any peculiar postures which might indicate deafness?	.....	.....

G. Eyes

1.	Are the child's eyes straight?	.....	.....
2.	Is he free from chronic headache?	.....	.....
3.	Does he do his work without fatigue?	.....	.....
4.	Is he free from squinting or frowning?	.....	.....
5.	Is the child free from postures which might indicate eye defects, such as leaning over too near the desk, holding the head on one side, etc.?	.....	.....
6.	Are the eyes free from redness and discharge?	.....	.....
7.	Are the eyelids healthy-looking?	.....	.....
8.	Can the child read writing on the board from his seat?	.....	.....
9.	Have the eyes been tested separately with the Snellen Test Type?	.....	.....

H. Communicable Diseases of the Skin

1.	Is the head free from any signs of disease (lice, ringworm)?	.....	.....
2.	Is the skin healthy-looking?	.....	.....

I. Eruptive Children's Diseases

Is the child free from the following general early indications of contagious diseases?

1.	Flushed face	.....	.....
2.	Lassitude	.....	.....
3.	Vomiting	.....	.....
4.	Eruptions	.....	.....
5.	Congested eyes	.....	.....
6.	Discharging eyes	.....	.....
7.	Nasal discharge	.....	.....
8.	Persistent cough	.....	.....
9.	Scratching	.....	.....
10.	Sleepiness	.....	.....

The following points often indicate the early signs of transmissible diseases in children. They will, of course, not ordinarily be observed at the time of making this Health Survey.

1. Flushed face.
2. Lassitude.
3. Vomiting.
4. Eruptions.
5. Red eyes.
6. Nasal discharge.
7. Persistent cough.
8. Scratching of the skin.
9. Sore throat.
10. General aches and pains.

Teachers may use their own judgment about this test.

SUMMARY

Physical development	
Nervous system	
Nutrition	
Mental condition	
Eyes	
Ears	
Nose	
Throat	
Teeth	
Skin	
Eruptive disease	
Food	
Ventilation	
Coffee habit	
Tea habit	

REMARKS

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From these individual forms the summaries may be made. The standard classification, terminology, code numbers, and probable frequency of serious ailments given in Chapter VIII may be used for the ailments and defects discovered.

(*b*) *School Sanitation.*—There are several forms on which the non-expert person may make a reasonably able survey of sanitary conditions. Doctor Ayres gives two brief forms in his survey of the Springfield, Ill., public schools. Other

forms will be found in the report of the Ohio School Survey and in Bulletin 524 of the Bureau of Education. The chapter on School Sanitation Standards in this volume, as well as the chapter on Rural School Sanitation, should prove helpful.[1] These forms are suggestive and the good points of many may be put together by the principal or superintendent for local use.

By this means the superintendent may obtain in compact form the sanitary status of his buildings and grounds. If some of the board members can be enlisted to help apply modern standards to the buildings included in the survey, it may be of strategic importance. If discussion arises, the superintendent should have some authoritative text-book on school hygiene, including school sanitation, ready at hand. Dresslar's book, published by Macmillan, will be found helpful. The survey of the Portland, Ore., school system will be suggestive (health phases made by Professors Terman and Dresslar).[2]

School Sanitation Forms Used by Doctor Ayres

I. PHYSICAL PLANT AND EQUIPMENT, BUILDINGS

Building.....Principal.....
Total number of sittings in classrooms.....
Seating capacity of assembly-room.....
Average attendance: boys .....girls.....
Average enrolment: boys.....girls.....
Classrooms: First floor.....Second floor.....Third floor.....
Total classrooms.....
Has principal room for office?....Location of assembly-room.....
Heating system: hot-air furnace, direct steam, indirect steam.....
Thermostatic regulation.....Humidification.....

[1] See the form used by the Philadelphia Board of Health, and the author's article on "The Standardization of the Rural School Plant," in *School and Society*, for February 13, 1915.

[2] The Rural School Hygiene Survey of the Rural Schools of Pennsylvania, made by the author, deals with all five divisions. It may be found in the Report on Rural Schools, State Superintendent N. C. Schaeffer, Harrisburg, Pa., Chairman.

Ventilation: window, gravity, plenum fan, exhaust fan.....
Location of fresh-air intake.....Location of cloakrooms.....
How ventilated.....Location of toilets.....
Toilets: Number seats for boys....Number seats for girls.....
Automatic flush.....
Number of individual urinals for boys.....
Do urinals have automatic flush?.....
Material of walls and divisions of urinals....of toilet floors.....
Number feet of urinal trough....Material of urinal trough.....
Number of wash-basins....Individual soap provided.....
Individual towels.....
Number of bubbling fountains....How often are windows washed?..
System of cleaning employed.....
How often are floors washed?....Are floors oiled?.....
Stairways of fireproof material?....Are stairways enclosed?.....
Material of enclosure....Hand-rails both sides....Centre hand-rail..
Width of stairways: first floor.....second floor.....
Width of steps.....
Height of risers....Width of corridors....Corridors unobstructed ...
Fire-escapes: number and kind.....
Signal connection with fire department....Inside hose equipment....
Chemical extinguishers.....Automatic sprinklers.....
Automatic fire-alarm.....
Heating plant separated by fireproof walls, ceilings, and floors?.....
Is building of fireproof construction?.....
Of fire-retarding construction?.....
Material of outside walls of building....of floor beams.....
Gymnasium facilities.....Area of playground.....
Area of site.....Area of space occupied by building.....
Date of construction.....

SHEET 8½ BY 11 INCHES

II. PHYSICAL CONDITIONS OF CLASSROOMS

Building.....Teacher.....Room No.....Grade .....
Av. attendance ....No. sittings: adjustable....Non-adjustable.....
Total.....
Length....ft. Width....ft. Height....ft. Floor area....sq. ft.
Cubic contents....cub. ft.
Square feet of floor area per sitting....sq. ft.
Cubic feet of air space per sitting....cub. ft.
Total window area....sq. ft.
Distance from top of window to floor....ft.

Square feet of floor area for each square foot of window area....sq. ft.
Windows at left, back, right, or front of children.....
Lineal feet of blackboard....ft. Lineal feet per sitting....ft.
Inches from base of blackboard to floor....inches.
Do seats project under front edge of desk?....How far?....inches.
How many pupils cannot easily rest feet on floor?.....
Distance from rear seat to rear wall....ft.
Color of walls....Color of ceilings....Color of window-shades.....
Do shades roll from top or bottom?....Has room a thermometer?...

CARD 4 BY 6 INCHES

(*c*) *Physical Education.*—We can call attention here to no good forms for investigating physical education. The calisthenics, plays, and games used, their supervision, kinds of play apparatus, kind of room calisthenics, two-minute exercise drills, games used in the schools, size of school playgrounds, athletics and their supervision, proportion of student population reached effectively by physical-education department, number and training of physical-training and other physical-education teachers and supervisors, the extent to which physical-education instructors discover ailments and defects, school bathing and swimming, athletic leagues, folk-dancing, etc., will be considered. Curtis's books on "Play and Recreation" and "Education Through Play" will be helpful here; likewise the *Playground Magazine* (No. 1 Madison Avenue, New York City), and a bulletin issued by the State Department of Public Instruction of Virginia on Play and Athletics, showing desirable home-made apparatus and plays and games. Another bulletin on Recreation, by the State Department of Education of Oregon, and the bulletin of the United States Bureau of Education on Play, are also desirable. Rapeer's "School Health Administration" has a chapter on this problem.

(*d*) *The Teaching of Hygiene.*—For this we have no good forms, although several surveys have considered the matter, *e. g.*, those of Ohio, Portland, Ore., and Vermont. This would include the kind and quality of text-books used, the amount of attention paid to the formation of good health

habits, such as cleanliness of person, tea or coffee drinking, sufficiency of sleep, ventilation of sleeping-rooms at night, etc., as well as attention to the provision of washing facilities, liquid soap, paper towels, toilet-paper, and sanitary drinking fountains at schools. It would include the time on the daily programme devoted to instruction in hygiene, the efficiency of the methods used, and the amount of correlation with other subjects. The chapters in this volume on the "Teaching of Hygiene" in elementary and high schools, in the author's volume on "Teaching the Elementary School Subjects," and the May, 1912, number of the *Teachers College Record* (Columbia University), on "Health Instruction in the Elementary School," by Professor Reesor, will prove helpful.

(*e*) *The Hygiene of Methods of Teaching and Management.*—Here we have problems concerning the daily and weekly programme as to proper alternation of subjects, proper time of day, suitable time between work periods, the hygiene of vision, including reading from bad type, the placing of children with defective vision and hearing at the back rather than the front of the room, etc. They cannot be well surveyed at present. Doctor Beik's two chapters in this volume will prove suggestive. Professor Terman has a volume announced on this interesting topic, namely, "The Hygiene of Instruction." Dresslar has a chapter on the subject in his "School Hygiene." This division may be omitted in the preliminary survey, however, if desired. If teachers, principals, and superintendent do their work well with the first four phases of the survey of educational hygiene, much will be accomplished.

(5) **Public Co-operation.**—When the school people have submitted themselves, their pupils, and their environment to such scrutiny, in the light of the school-health standards available, they can proceed to do much along all five lines of educational hygiene without calling upon the board for expenditures of money. However, their work will necessarily

be somewhat faulty, especially along medical lines. Parents can be visited in the homes by teachers as well as by nurses, of course, but the training of the nurse and the fact that she is a nurse, or is called "nurse," will give her an advantage. The examination by a physician, especially with the parents present, adds much to the effectiveness of the work of medical supervision. Then, too, in cities above 10,000 population there is need of a single school health supervisor who can supervise all phases of educational hygiene.

At this stage, then, it is desirable to have direct public co-operation for instituting a trial nurse, doctor, school dentist, all at once or in pairs. Most school features have been initiated in this manner, namely, first a trial on a limited scale paid for and inaugurated by private groups or individuals; demonstrated success, or general conviction that the feature is desirable as a part of public-school work; and, third, the adoption of the measure and its support by public taxation.

Here a strong parent-teachers' organization, or several of them, may be formed to promote this work. Dues may be charged and donations collected. Women's clubs and various private organizations may be appealed to in various ways. Elsa Denison's book on "Helping School Children" and Mrs. Cabot's book on "Volunteer Help to the Schools," as well as Mr. Perry's chapter in this volume and his book on "The Wider Use of the School Plant," will be of great assistance here. Dresslar's chapters in the 1912 and 1913 Reports of the United States Commissioner of Education will also give much help. The superintendent should make a survey of the city to discover all possible individuals, groups, and organizations that will help. Sometimes national bodies can be called in to assist without expense, and at other times the business men's club or commercial club will take the matter up, as the Chicago Club has the matter of vocational education. Such an investigation need not take long. The idea is *democratic advance through public awakening and group initiation of new measures—genuine school leadership.*

(6) **Volunteer or Partly Paid Specialists.**—Along with this will come the appeal to the dentists', physicians', and nurses' organizations for voluntary or partly paid work in the schools. A group of physicians can often be procured each individual of which will offer his services for a certain number of two-hour periods during the year on a schedule made by the superintendent, the latter to notify each physician ahead of time. The same may be done for nurses and dentists. A nurse may be loaned for part time by the visiting nurses' organization while the other part of the time may be paid for by the school associations from the voluntary fund. If possible, a full-time nurse should be employed to begin with. Later a part-time physician may be employed. One nurse for each 1,500 pupils and one physician two hours a day for each 2,500 pupils are good standards.

(7) **Public Adoption.**—Through this voluntary demonstration the ground has been broken for the final step of school-board support. With the public aroused and acquainted with the facts, with constant newspaper articles and pictures, with budget exhibits and play pageants, with records of lowered retardation and elimination figures, and fewer cases of disease and death, most boards will move forward to occupy the ground broken by private initiative, led by the superintendent. Such leadership is real statesmanship and is of a far higher type than the more obvious kinds often going on under the name of politics, war, diplomacy, and the like.

CHAPTER VIII

THE GENERAL ADMINISTRATION OF EDUCATIONAL HYGIENE

Facing the Health Issue.—The general health problem, which has been sketched in previous chapters from the standpoint of social economy, has in a more or less vague way, during the last decade, been rapidly rising in the national consciousness. Leaders in great numbers in all parts of the country have rather suddenly awakened to the fact that the most important human asset we possess is being wasted and destroyed in the most thoughtless manner, and that the most important kind of conservation of natural resources in which we in America may engage is that of the conservation and development of our national health and vitality. The progress of science has developed in many and marvellous ways an unparalleled array of instrumentalities for overcoming death, disease, and physical imperfection. Where we once sat in darkness and shivering fear at the terrible mysteries which robbed us of life, health, and happiness there is now an increasing light. The work of Pasteur, of Koch, of Reed, of Galton, and many other scientific students of life and health has borne glorious fruit not only in remarkable additions to human knowledge but in an increasing number of men and women working in the laboratories of life wherever the problem of health and vitality may be concretely and intimately met and studied.

By these various means we have come to the amazing spectacle of an enlightened people in need of these health principles in their daily life and practise and yet from ten to forty years, in general, behind the chariot of Truth drawn

forward so rapidly by the small number who are her devotees. The new health science is produced and kept in the possession of but a very few, while the old mores and customs of the people remain largely untouched. To make this knowledge common property and daily, living practise, to create and foster more agencies for learning the truth regarding health and vitality, and to discover how new health standards, ideals, and practises may be so inculcated in the daily lives of the many as appreciably to improve the health and vigor of our nation—these are the problems of educational hygiene.

Public-Health Improvement.—In these few early years of the twentieth century, as suggested, the anomaly here presented has been sensed by many leaders in many lines of work. Newspapers and magazines have taken up the problem, public opinion has been in many places aroused, and the public-health spirit, which has been dormant throughout the long health dark-ages since the early Greeks revered Hygieia, has come by a new birth again into its rightful position among the values of life. The first vague stirring of this new health spirit has been evidenced in a most interesting and exceptional heterogeneity of efforts directed toward the discovery of the specific nature of our health problems and the best methods of solution. The playground movement, the anti-tuberculosis campaigns, the movement toward registration of births and deaths, the various health philanthropies of an investigative and curative nature, such as those of Rockefeller, Forsythe, Sage, Carnegie, and many others, the school-medical-inspection movement—these, and hundreds of others, have in infinite variety sprung up spontaneously to fight down the enemies of health.

In the schools these various health and development measures have been introduced by many agencies for many purposes. At present they appear to many as a host of uncorrelated, poorly manned, and poorly directed agencies, little beyond the stage of miscellaneous fads. There is, for example, the present great and important interest and effort

along the line of the psychological examination, treatment, and education of mentally deficient or exceptional children; there is the movement for better school sanitation, including better ventilation and lighting, the abolition of common drinking-cups and common towels, etc.; the provision of playgrounds for all children; the creation of school clinics, and medical inspection and examination; and many others. The onlooker who sees these agencies as miscellaneous, weak, uncorrelated, and largely inefficient undoubtedly sees them aright, for these adjectives truly describe them. As such, the situation furnishes us a social emergency. For the danger is that the first weak and halting steps in any of these various directions may be taken as permanent standards, as has so often happened; also that the development may be one-sided and faddish, that important agencies will languish and die out, that the work may be wasteful and expensive, and that the whole health movement, now so promising, may largely fail because it has not risen to the hopes and needs of the times.

School-Health Principles.—The efficiency of these various agencies in the schools is the topic of this chapter. Scientific management in business, the success due to organization and correlation of scattered parts in great corporations, the supreme importance of supervision and leadership as well as professionally trained workers in the schools, and the scientific and democratic needs and tendencies of the times, all furnish suggestions for lowering the cost and increasing the efficiency of school-health work. Some of the important and essential principles seem to be as follows:

(1) School health and development work is a specialty and must be placed in the hands of those specially educated for this service. This, however, will not displace, but make more efficient, the teachers, principals, and supervisors.

(2) The various phases of school-health work must in each school system be organized into a single department centred on the solution of the school-health problem.

(3) The professional training of teachers must henceforth

include, as at least correlative with educational psychology, the study and practise of educational hygiene.

(4) These teachers and the doctors, nurses, dentists, oculists, and psychologists must have expert leadership and supervision.

(5) The adult public must be educated through the schools; and, finally,

(6) The parents and general public must be helped as never before to co-operate for school-health progress, not only for the sake of the children and the schools, but for their own educational participation.

The Divisions of Educational Hygiene.—We cannot here support at length these generalizations. To a large extent they seem self-evident to any one acquainted with the actual conditions in the schools and the actual successes of many able educational and other leaders. They are fairly general principles underlying the success of practically any public agency in a democracy. Of all agencies the public-school systems of the country should for many and sufficient reasons be most democratic and most efficient. We shall attempt in the following pages and chapters to sketch broadly the methods by which the various factors may be correlated in the service of school and national health.

Now, what are the more immediate ends to which the schools should direct their efforts in this work? We might give a list such as fresh air, good food, sleep, clothing, sunlight, recreation, freedom from malignant germs, etc. A number of organizations of these health factors might be made. Burk's book on "Health Work in the Schools" has something of the above outline. Of the many possible we choose the following because of its simplicity, its practicability, and its ease of introduction, namely:

(1) Determining the actual physical and mental nature of the children as measured by the normal or typical, with necessary remedial measures. This will practically mean a health census of school-children, with special reference to the

pathological, actual and incipient, and to the exceptional. This division will determine the actual physical condition of children and attempt to get them placed in normal condition. The best name for a division to work in this field yet suggested seems to be that of *Medical Supervision.*

(2) Providing a hygienic school, home, and community environment. On the basis of what is learned of the physical nature of children there can be gradually developed for them an environment that will promote health and normal physical development. The best name at present for this division is the common one, *School Sanitation.*

(3) Providing for the development of splendid bodily resistance and a healthy, happy body and mind, including medical gymnastics, play, physical training, certain forms of recreation, and others. The best name for this division appears to be *Physical Education.*

(4) When we have learned the actual physical condition of the children and have put them into fairly normal condition, after we have provided a hygienic environment for them, and after they are provided with wholesome physical education, then there comes a fourth division devoted to teaching the pupils the principles, the ideals, and many of the habits of health. This division may be termed merely the *Teaching of Hygiene.*

(5) But more is needed than medical supervision, school sanitation, physical education, and the teaching of hygiene. We may put the children into good physical condition, in a hygienic environment; we may furnish them with excellent physical education, and provide skilled teachers of hygiene; and yet the *methods* of handling the children, the methods of teaching, examining, training, and curing, may be such as to promote worry, exhaustion, fear, and many other unhygienic symptoms. A neurasthenic and "cranky," though scholarly, teacher may injure the health of children by bad methods. This division deals with *the hygiene of methods*, or as it is commonly termed, perhaps, *The Hygiene of Instruction.*

The plate accompanying gives a rough idea of this organization.

Now, when we have analyzed out these five functions and created divisions of effort and attention to promote them, we have a fairly complete organization. Some may object to the placing of the work of the clinical psychologist under medical supervision. However, this is a picture of the actual development now going on in this country and abroad, and seems based on good scientific and practical grounds. When, perhaps, the use of the Binet and other tests of intelligence, the special classes for mentally subnormal and mentally gifted, and the whole clinical psychology technique is better developed and manned than at present, there will be created in many large school systems this separate division as an actual, outward reality.[1] We leave it, however, for the present with the medical supervision in the confidence that the physicians, dentists, nurses, and psychologists can work together very well in the service of the exceptional, or subnormal, children, physical and mental.

It may also be said that the Hygiene of Teaching belongs here as a separate division. This is the hygiene of an occupation, teaching, and it is of great importance financially and educationally and much neglected. Terman has emphasized it in his little book on "The Health of the Teacher." But the teacher needs all that the pupils need: medical examination periodically, any necessary treatment, physical education, especially recreation, a healthful environment in which to work, education along the lines of health, and such supervision and administration as will promote her best work and health, not their opposites as so often happens. Through the efforts of the Life Extension Institute many business organizations are using similar methods of guarding the health of their workers. The State is even more bound to exercise such care. Teachers, janitors, and others, then, may be dealt with in the five divisions given. In short, these five divisions seem practically and scientifically justified.

[1] As in St. Louis and certain other cities.

THE DIVISIONS OF EDUCATIONAL HYGIENE

Supervisor of Hygiene

MEDICAL SUPERVISION	SCHOOL SANITATION	PHYSICAL EDUCATION	TEACHING HYGIENE	HYGIENIC TEACHING
NURSES AND DOCTORS.	SCHOOL SITES AND ARCHITECTURE.	PLAY AND PLAYGROUNDS.	HEALTH EDUCATION OF TEACHERS.	"THE HYGIENE OF INSTRUCTION."
INSPECTIONS AND ANNUAL EXAMINATIONS	VENTILATION.	PHYSICAL TRAINING AND GYMNASTICS.	ADVISING CHOICE OF BEST HYGIENE TEXTS AND TOPICS.	FATIGUE, OVER-WORK AND UNDER-WORK.
SCHOOL CLINICS.	LIGHTING.	MEDICAL GYMNASTICS.	FORMING PERSONAL HYGIENE HABITS.	THE TYPE OF BOOKS.
HEALTH CENSUS.	HEATING.	ATHLETICS AND LEAGUES.	PUBLIC HYGIENE STUDY AND CO-OPERATION.	THE HYGIENE OF SCHOOL SUBJECTS.
DISCOVERING HEALTH NEEDS.	DRINKING WATER AND FOUNTAINS.	POSTURE AND CORRECTIONAL EXERCISES.	HEALTH EDUCATION OF PARENTS.	INTEREST AND ATTENTION.
CO-OPERATING WITH BOARDS OF HEALTH AND PRIVATE ORGANIZATIONS.	SCHOOL CLEANING.	ASSISTING IN MEDICAL SUPERVISION.	FEEDING, CLOTHING AND SLEEP OF CHILDREN.	INTER-RECITATION RE-CREATION.
OPEN AIR SCHOOLS.	VACUUM CLEANERS.	RECREATION.	HOME HYGIENE IN DOMESTIC SCIENCE.	TRANSFORMING NEURASTHENIC AND "CRANKY" TEACHERS.
LIMITING DOCTORS TO EXAMINATIONS.	SCHOOL BATHS.	SCHOOL EXCURSIONS AND TRAMPS.	VOCATIONAL HYGIENE IN INDUSTRIAL SUBJECTS.	MOTOR ASPECTS OF TEACHING.
SUPERVISION OF NURSES AND WORK IN CLINICS.	HYGIENIC TOILET FACILITIES.	BOY SCOUTS AND CAMP FIRE GIRLS.	TALKS BY DOCTORS, NURSES AND SPECIALISTS.	THE GOSPEL OF WORK.
PSYCHOLOGISTS, OCULISTS, SURGEONS, DENTISTS, PHYSICIANS.	SCHOOL SEATS AND DESKS.	GYMNASIUMS AND ATHLETIC FIELDS.	FIRST AID.	THE HYGIENE OF JOY IN SCHOOLS.
SUPERVISION OF SCHOOL FEEDING.	DECORATION.	SWIMMING AND BATHING.	SEX HYGIENE	PREVENTING PHYSICAL DEFECTS AND PATHOLOGICAL CONDITIONS.
SCIENTIFIC STUDIES OF PREVENTION AND CAUSE OF DISEASE.	THE STANDARD SCHOOL ROOM.	POOLS, SHOWERS AND BEACHES.	STUDYING COMMUNITY HEALTH PROBLEMS AND METHODS OF IMPROVEMENT.	SCHOOL PROGRAMS.
CAREFUL RECORDS EMPHASIZING SERIOUS AILMENTS FOUND AND CURED.	FIRE-PROOF CONSTRUCTION.	FOLK DANCING.	DAILY ORAL QUESTIONNAIRE ON HOME HYGIENE: USE OF TOOTH-BRUSH, COFFEE DRINKING, VENTILATION, ETC.	PART-TIME OR WHOLE-TIME.
TRAINING SCHOOL NURSES FOR ALL INSPECTION AND EXAMINATION.	HEALTH, REST, AND EMERGENCY ROOMS.	PHYSICAL EDUCATORS WITH MEDICAL KNOWLEDGE.	HEALTH KNOWLEDGE, HEALTH IDEALS, HEALTH EFFICIENCY.	INFLUENCE OF VACATIONS AND HOLIDAYS.
NURSES AS ATTENDANCE OFFICERS.	PLAYROOMS AND ROOF PLAYGROUNDS.	HIGH SCHOOL CADETS.		HEALTH INDIVIDUALITY.
	OPEN WINDOW ROOMS.	CLASS ROOM GAMES.		HYGIENIC EFFECTS OF DIFFERENT METHODS.
	SUPERVISION OF JANITORS.	PAY FOR SUPERVISING PLAY AFTER SCHOOL AND SATURDAYS.		THE TEACHER AS MEDICAL GUARDIAN.
	HYGIENIC CLOAK ROOMS.	CULTIVATING THE GREEK IDEAL OF PHYSICAL AND MENTAL PERFECTION.		
	DRYING AND WARMING SEATS.			
	INVESTIGATIONS OF RE-CIRCULATION, HUMIDITY, AIR-CLEANING, DISINFECTION, ETC.			

We have now an organization of the field of educational hygiene. How are we going to get these various phases of the service to work together with the greatest efficiency and the least expense? How are we to provide the expert supervision and service which we have named as essential? Without going into the detail desirable, and attempting to avoid the pitfalls of devising a general cure-all for all kinds of school systems, we offer for consideration the following plan of administrative organization:

The Administration of Educational Hygiene: A Tentative Standard Plan.—School superintendents are not specialists in the field of educational hygiene. Their education has generally been very much lacking in training along the lines of the physical, rather than the mental, nature of children, and most of the various health measures have come into the schools because of pressure by organizations and individuals from without school systems. The average superintendent probably spends very much less than one per cent of his time in studying and superintending school-health work. As there have been added in most progressive school systems supervisors of the various special phases of school work, so there must be supervisors of educational hygiene. In the past, and to a large extent at present, we have supervisors and teachers of physical training, and supervisors and instructors for playgrounds; doctors and nurses are rapidly being added;[1] dentists, oculists, dermatologists, psychologists, and surgeons are being provided. The regular teachers need education and inspiration along the lines of health work. There should be, then, a specialist in the schools to co-operate with and to lead the many civic and other bodies that have or may take a part in school-health work. All these needs and heterogeneous agents furnish the problem for organization and scientific management.

[1] The Bureau of Education reported in 1914 that of 1,300 cities with a population of 2,500 to 30,000 inclusive 516 cities report medical-inspection systems, and that 86 of the 516 have one or more school nurses.

The only one who can adequately organize, supervise, and make efficient these miscellaneous instrumentalities and agents must be the educational hygienist. The educational hygienist should be one who knows well and can successfully supervise all the manifold phases of school-health work. The average physician is little versed in pediatrics, and not at all in school work and the phases of educational hygiene outside of mere medical inspection. The average physical-training teacher or supervisor knows something of her subject, but little more. The educational hygienist must know the schools and their problems; he must either be a physician skilled in the field of children's diseases and child hygiene, or an educator who has had such study and experience in the fields of school sanitation, sociology, the phases of medical training which may function in school medical supervision, in physical education, and, perhaps, in the two remaining divisions of educational hygiene, as will enable him to supervise all school-health work. The ordinary medical course is a very poor training for such work. We need a four-year course that is designed especially to develop educational hygienists. Such a course may be provided in connection with some progressive college for the training of teachers, such as Teachers College, Columbia University, which is now purely a graduate institution, in some good medical school, or in connection with the courses that are now provided at the University of Wisconsin, at Cambridge, England, and elsewhere, to educate doctors of public health—D.P.H. A teachers college near and connected with a medical school would make a very desirable combination.

Not having such training courses as yet, we should take physicians who have had experience in physical education, physician-physical-educators, or take educators who have had the elements of a medical education and who are versed in physical education, including normal diagnosis, medical gymnastics, play and playgrounds, and so on. The average physician has almost as far to go in perfecting himself for

this work as has the educator. In an effort to provide such educational hygienists for several cities and State departments of education the writer has found in this country over twenty available physicians who have had sufficient experience in physical education and school work to make success possible in this new field. Several cities, such as Boston, Albany, Minneapolis, New York, and others, have such men as supervisors of hygiene for the schools, and a number of State departments of education are looking forward to providing such officers. The State Board of Health of Minnesota employed for some time such a hygienist, Doctor Hoag, who has a chapter in this volume and whose report of this work is printed by the United States Bureau of Education. As soon as universities establish chairs and departments of educational hygiene, similar to those established at Clark, Stanford, and Teachers College, Columbia University, and as soon as more cities and rural regions demand such school-health officers, we shall have forthcoming a sufficient supply of eager and qualified young men.

Such an official could be made co-ordinate in rank with other supervising officers under the general superintendent of schools, and could in many places so reduce school expenses as to save his own salary. The salary of such men must be between two and four thousand dollars, almost the salary of superintendents. Such an official, however, can frequently do the work of several part-time physicians, or medical examiners or inspectors; he can frequently take the place of one or more physical-training teachers or supervisors; he can direct athletics and summer playground work, evening recreation centres, and public-school athletic leagues; he can frequently direct the school nurses in such a manner as to eliminate one or more special truant officers; and he can make the work of the whole health and development corps more efficient, eliminating waste, testing results, cutting down exclusions and illness-absence, and consequently retardation, elimination, and non-promotion. The health of the children

of the schools and nation will not be adequately preserved and developed until such a definite organization and such health leaders are incorporated in school systems. Efficient leadership furnishes that scientific management, inspiration, and breath of life necessary in all successful social organization, and the school cannot afford longer to miss its advantages in the fundamental field of health.

The United States Bureau of Education and the English and Scottish National Boards of Education at present have such supervisors of educational hygiene, the last two being physicians and the first not. France, Germany, and Sweden, especially the last, have gone a long way in this direction. The State Commissioners of Education in Massachusetts and New Jersey have both recently made efforts toward getting such officers added to their departments for State supervision. The demands of economy, of leadership, and of efficiency will soon force most other States and most cities, as well as many rural regions, to supply such officers.

Boards of Education, not Boards of Health.—This work must be placed everywhere, except perhaps in certain rural regions for a time, in the hands of the boards of education, not of the boards of health. I have treated this problem at some length in "School Health Administration," examining all sides of the question. Efficiency cannot come through administering any part of the school's work for children by some outside agency. Statistics and experience prove this; and the tendency is everywhere toward placing the work in the hands of the boards of education. Doctor E. H. Lewinski-Corwin has shown that a great factor in the success of medical supervision is the degree of co-operation which the medical and health officials obtain from the teaching corps.[1] Such co-operation can never be generally attained with this work in the hands of boards of health. Many other facts in the

[1] "The Practical Necessity of School Clinics," an investigation of the treatment of school-children in New York City, in the *Popular Science Monthly* for May, 1914.

situation favor the school's administration of this work, while few favor board-of-health control.

Scientific Organization with Little Increased Expense.—As stated above, the expenditure for such a supervisor of hygiene, in cities that already are doing their duty to the children in the line of health, with school doctors, nurses, and physical-training teachers, frequently may require little or no addition to the present school budget, the work being merely that of reorganization of the various health provisions which have, in various ways and for several years, been coming into the school systems. In all but the largest cities the director can take the place of one or more part-time physicians, and can also do the work of one or more supervisors, or teachers, of physical training in the elementary schools. Money can also be saved as suggested by having him direct the summer playground work which now costs a number of cities considerable sums, the school clinic or clinics when started, high and elementary school athletics, evening recreation, and a number of other savings which may go to make up his salary. The nurses, when so directed, may take the places of attendance officers in many cities, and so save another considerable item.

The present expenditures in these fields and the reorganized expenditures have been given for twenty-five cities in "School Health Administration." Most cities have not yet caught up with the school-health needs; but most cities of average size can secure such departments of hygiene for little over 2 *to* 3 *per cent* of current school expenditures. In many, the *added* expense will, as suggested, be inconsiderable.

For further concreteness, the old and the new reorganized expenditures, for a fairly typical city already possessing the elements of such a department, are here given. This city has a population of about 50,000; there are fifteen schools, a public-school average enrolment of 6,000 pupils; and annual current expenditures amounting to about $250,000.

OLD, UNCORRELATED SYSTEM

2 high-school teachers of physical training	$2,200
2 elementary-school teachers of physical training	1,800
6 physicians, two one-hour school visits weekly, at $300	1,800
3 school nurses, 44 hours a week, at $750, ten months	2,250
Total	$8,050

REORGANIZED, DIRECTED SYSTEM

1 supervisor of hygiene, full time, 11 months	$3,000
2 high-school teachers of physical education	2,200
1 assistant physician, two hours a day, ten hours a week	400
3 school nurses, 44 hours a week, 2 at $825, 1 at $750	2,400
Total	$8,000

Here we have the new organized and directed system at less than the original cost. There remain $50 toward more efficient records and blank forms. We have deducted nothing for saved expenditures for attendance officers, playground direction, etc., nothing but five unnecessary part-time physicians and the two elementary teachers of physical training. Where the latter officials are paid less in the old system and the supervisor $2,500 instead of $3,000, there is another balancing of expenditures. The point is that the added expense need not be great.

The third nurse may not be added the first year, which would give a further reduction of $750. Perhaps scientific management may make her permanently unnecessary in many cities. The tendency is, however, in the other direction.

The supervisor can, with the daily help of one of the two or three nurses, for two hours a day, examine the same number of children as the assistant physician, 3,000; and he can call the teachers together by grades and teach them how to carry on the physical-training work at the schools; and can take part of each day in supervising their work.

The assistant physician is paid $100 more a month, and

gives *two full hours* in *one school* daily. With the assistance of one of the nurses he can examine during the school year the other half of the school population (3,000 pupils), and can help make such inspections as are necessary. The third nurse, if employed, is left free for individual and classroom inspections and for follow-up work. Neither the teachers nor the physicians are bothered with vision and hearing tests, the nurses making them; and practically all clerical work connected with medical supervision will also be done by the latter. The physicians will be free for technical medical work, and the teachers will be less interrupted.

Two of the nurses are paid for an extra month in the summer, one for July and one for August, to follow up cases not cured at the end of the school year and for necessary inspection of children at summer schools and playgrounds. Some of the most valuable work now being done by nurses is accomplished in these summer months; and the number of skin, parasitic, and infectious ailments is very much less at the opening of the next school year.

The two high-school teachers of physical training, one a man and the other a woman, are left at perhaps the same salaries ($1,300 and $900).

The supervisor of hygiene gives his entire time to the work, not for ten but for eleven months. If he obtains a thoroughly good assistant school-physician, the salary of the latter may be raised from $400 to $500 or more, but not sufficient to make possible the employment of another nurse at the same sum perhaps. It may be well to employ a woman physician as part-time medical examiner so she may better examine the high-school girls.

The trials and tribulations of the superintendent in trying to get regular and responsible work from part-time physicians and in attempting to direct medical work without medical knowledge are now at an end. He has a small, compact, and almost entirely full-time force. These are essentials. The entire part-time element may yet be eliminated, but it

will mean salaries from $1,500 to $2,000, at least, for full-time assistant physicians.

Later developments of the system can be made, however, after intelligent study and experience. If another physician is desired he may be obtained, and if, as the city grows, an assistant in physical education for the elementary schools is found necessary, the addition can be made. But these additions are intelligent choices by an expert in educational hygiene, after reasonable investigation. We attempt to give here only minimum essentials and suggestions for beginning or reorganizing the work.

At the recent International Congress on School Hygiene at Buffalo the writer was given practically the following facts by a member of a board of education of a typical New England city (about 9,000 pupils) with a request for a plan of efficient reorganization:

PRESENT "INEFFICIENT" SYSTEM

12 part-time physicians at $500	$6,000
0 nurses	000
2 truant officers	2,500
1 elementary physical-training teacher	1,000
1 summer director of playgrounds	150
Total	$9,650

This system, recognized by the board of education as inefficient and not getting results, is a finely devised machine for securing little more than a collection of pathological statistics of school population. The time the physicians spend in the schools is unknown; and they have no supervision nor nurses to follow up cases and get treatments and cures. There are no public dispensaries for free treatment of children, and a large share of the population is too poor to pay $20 for an adenoid operation, for example, or to provide regular daily or weekly treatment for favus, ringworm, discharging ears, and other ailments. There is enough money being spent, however,

to get efficient results in this field. Leaving the high-school directors of physical education in their places at the same salaries, we have for a beginning the following:

PLAN OF REORGANIZATION

1 supervisor of hygiene, a physician-physical-educator	$2,500
6 school nurses, 4 at $700, 2 at $770	4,440
2 part-time physicians, two hours daily, at $500	1,000
1 school clinic, with dental, surgical, and medical divisions	1,000
1 school dentist, with staff of voluntary dentists	500
New blank forms for records and reports	210
Total	$9,650

Here we have a vastly more efficient system at the same expenditure of money; we have skilled leadership and supervision; we have a plan which unifies all school-health agencies; and we have the emphasis where it belongs, on prevention and cures. Necessary changes can be made after adequate investigation by the hygiene supervisor and superintendent of schools. After the first year the thousand dollars of the budget spent for equipping the school clinic will be available as a salary appropriation for one or two part-time physicians.

For the largest cities, such a health reorganization can easily be made, and it is practically possible for many cities having a population almost as small as eight or ten thousand. *Several towns may even go together and employ such an expert,* as superintendents are now employed in several States. And even *rural* districts may unite in the same way for the expert services of an educational hygienist and several nurses.[1] The great need is for health experts and for health leadership. The people will respond and act along the best health lines when the health knowledge, now the possession of the few, is made the possession of the many. We have suggested here a possible channel for such general health enlightenment.

[1] See the writer's survey of rural school hygiene in Pennsylvania as given in the 1914 "Rural School Report" to the Pennsylvania State Educational Association.

The far-reaching influence of such school-health leadership on national health and vitality can as yet hardly be imagined.

Other Plans for the School Medical Service.—Disregarding as ineffective the *physician-alone plan* for school-medical work, we have two principal alternatives for serious consideration: the *physician-and-nurse plan*, already suggested, and the *nurse-alone plan*. For both there is the need of a supervising director of hygiene, unless the superintendent of a small city is exceptionally well qualified medically and has time to devote to the work. We need supervisors of hygiene as much or more than we need supervisors of music, drawing, and such subjects. For both plans we may have either physical examinations with inspection or only inspection alone. We shall take the stand that routine *examinations*, annually, are important as well as inspections. In the nurse-alone plan the routine *inspections*, with the use of individual cumulative health-record cards, can, at first, take the place of complete medical examinations, by simply adding the vision and hearing tests.

The nurse-alone plan is, in general, far superior to the physician-alone plan, for a number of reasons, chief of which is that the former gets treatment and cure for a large percentage of the cases, while the latter procures treatment and cure for but 5 or 6 to 20 per cent of the cases. Furthermore, the nurses can find most of the cases of all kinds, and can inspect satisfactorily, as proved in New York, for infectious diseases, especially when under supervision (September, 1911, Report of Bureau of Municipal Research). Cities as small as Canton, Mass., with less than 5,000 population, and as large as Oakland, Cal., with nearly 200,000, get good work with only nurses, under supervision. (Reports and letters of Doctor Arthur T. Cabot and of Doctor N. K. Foster, respectively.)

Newark, with thirty-eight doctors and eight nurses, has reversed these figures by exchanging two doctors for each added nurse. Only five or six doctors were kept as district supervisors of the nurses. With the general supervisor

as before, this has already greatly increased the efficiency for the money expended. Further, physicians can work but part time, while nurses devote their entire time to the work. The physicians are irregular and difficult to control in large numbers, while nurses, with practically no serious competing interests, are easily directed. And, finally, they are less than half, and frequently only one-fifth, as costly, hour for hour, and for the year, as physicians. The tables given in the writer's volume previously mentioned show even greater disproportions of cost in a number of cities, when the annual number of daily visits, and number of hours each, are taken into consideration. Good, regular physicians, furthermore, can spare little more than two hours a day regularly and punctually from their practise; and physicians for longer periods must be paid too much and cannot well stand the strain and monotony of long-continued examination or inspection. Diminishing returns, with the larger salaries for full-time physicians, bring in the school nurse often much more efficient hour for hour than such physicians as can be obtained. That the nurses need *training*, before and while in service, and that they must have competent *supervision*, is immediately apparent. The plan here outlined, however, places the emphasis upon the nurse *and* the physician, the physician-nurse plan. Getting full-time work from all school-health officials, a great desideratum, remains a nice problem for careful study and local adjustment. The first thing is to get the hygiene supervisor, next the nurses, and, finally, part or full time physicians. A very small city unable to obtain, with others even, a supervisor should start if possible with a nurse rather than with part-time physicians. If only a physician is employed the principal and teachers must do the follow-up work. In either case the record and report forms given in a later chapter may be used.

Where to Obtain School Nurses.—As with all other forms of public service, the success of medical and health work depends very largely upon the character of the persons

chosen to carry it on. The greatest weakness of our school systems at the present time is due to the fact that our teachers are quite generally young women novices with a teaching tenure of three to five years only, and very largely ignorant of, and inexperienced in, the real life of the community and nation about them. Educational readjustment must wait upon the improvement of the character of the teaching force. With even the best of supervision and the most scientific plans of management the health service, likewise, can remain palsied, feeble, and inefficient.

After deciding to obtain officials for the school-health work, therefore, the practical problem becomes one of obtaining high-class health agents. For nurses, we must as yet depend very largely upon the various training schools for visiting nurses, and the visiting nurses' associations. The Department of Nursing and Health, under the direction of Miss M. A. Nutting, R.N., at Teachers College, Columbia University, in New York City, is at present the only institution in the country which gives special instruction and training for school nurses, and the number who can be supplied is at present very small. This is the first source I should recommend.

Miss E. P. Crandall, R.N., Executive Secretary of the National Organization for Public Health Nursing, 52 East Thirty-fourth Street, New York City, and Miss E. L. Foley, R.N., Superintendent of the Visiting Nurse Association, 104 South Michigan Avenue, Chicago, may also be depended upon to advise school systems of graduate nurses who are specially qualified for and looking toward public-school work. Miss Fannie F. Clement, 713 Union Trust Building, Washington, D. C., can give valuable information regarding the Red Cross Rural Nursing Service and persons available as school nurses. The Boston District Nurses Association in affiliation with the Boston School for Social Workers, as well as the Cleveland Visiting Nurses Association in affiliation with Western Reserve University, and, finally, Phipps In-

stitute of Philadelphia are also in touch with most nurses in the country.

The editor will be pleased to send the names of any persons known to be qualified either as hygiene supervisors or as school nurses to responsible persons, without charge to either party. Like Albany, N. Y., a city may find in its midst a man qualified both as a physician and a physical educator for such work, and good nurses amenable to training in the school service.

The Future.—It is not to be expected, of course, that this plan is a cure-all. It is based on the actual conditions and needs of schools and does not represent anything impossible in the way of money. In this country and abroad cities and states are actually adopting it with slight variations, and we believe it is scientific and along the right lines for the best future growth. The recommendation of a skilled supervisor of hygiene in each school system or group of schools is the best guarantee of study, growth, adaptation, and improvement.

The plan as extended to medical supervision I give in a later chapter. The State's responsibility and opportunity for school health administration and extension will next be taken up.

CHAPTER IX

A PLAN OF STATE CO-OPERATION FOR SCHOOL-HEALTH PROGRESS

Importance of Co-operation in School-Health Administration.—The co-operative commonwealth has been the dream of many a philosophical imagination. No one dream has ever come true in detail. But that co-operation is a fundamental necessity in community life is becoming more and more evident with the increasing variety and complexity of human relations. This co-operation is desirable and necessary not only to conduct successfully business, social, and political affairs, but it is yet more necessary to ward off and to correct the ills of the community, both the present ills and those that threaten.

Differing points of view on matters of vital importance, due in the main to differing habits of thought and of action and to unequal distribution of knowledge, are largely responsible for those conditions in community life that are dangerous. An extremely unequal distribution of wealth is harmful and often dangerous; but the condition of ignorance regarding the fundamental facts that may be known in matters pertaining to health and industry creates situations that menace community prosperity. For from such ignorance result unhygienic and wasteful habits of life and serious, antagonistic prejudices.

Education and Health.—Education, *i. e.*, the process of informing and training in right practises, appears to be the sole force by which those community conditions that menace health and prosperity may be bettered. In the evolution of

the general educational programme every important community activity is involved, and it requires for its carrying out the employment of national and State as well as local agencies and resources. Particularly is this true of education in hygiene.

Responsibility of State Departments of Education for Public Health.—It is not the purpose of this chapter to discuss national and State legislation and administration of health agencies, but to call attention to the fact that a State department of education must accept in any general educational programme a larger responsibility than it has assumed in the past, viz., the responsibility for systematically promoting educational propaganda among the adult, non-school-attending part of the population. With this responsibility it must also assume the task of securing general approval and support in the State for those educational measures that it is desirable to introduce into the schools.

Lectures and widely circulated printed bulletins have been the principal means employed by the State in the past for disseminating information. More recently specific training has been offered by the State in a desultory sort of way to adult citizens, in agriculture and other industries. But the numerous voluntary organizations now found in every State may become powerful allies in any proper educational movement.

The State's Share of Responsibility.—Some part the State must take in the affairs of each community, but in a democracy it would appear:

First.—That the State should take over completely only those responsibilities that by their nature cannot be shared successfully with local authorities.

Second.—That it should become a partner in those responsibilities only which by their nature are partly extra-local.

Third.—That it should not regulate any local activities except those upon which the prosperity of the State depends, and these only when local regulation has proved ineffective.

Fourth.—That so far as possible the State should express itself by the avenues of advice, inspiration, and information rather than by dictation and compulsion.

The individuality of a locality must be preserved, its intelligence must be promoted, its initiative must be strengthened, its conscience must be kept alive, its citizenship must be trained, because the "locality" is the training-ground for whatever citizenship is in the State.

If the State is to succeed by democratic rather than by autocratic means, its measures and proposals must have the approval of "public sentiment." To secure this approval and to transform it from a passive to an active force, it would appear that the State must be in close co-operative relation with those factors in the State that are intelligent and powerful enough to create a favorable "public sentiment" and aggressively to support a given policy in each locality.

Getting Health Agencies to Work Together for a Common Purpose.—These considerations were forced upon our attention when the commissioner of education decided to formulate a comprehensive plan of instruction and training in hygiene for the schools of New Jersey. It was evident that any such plan to be effective in the schools must comprehend the *adult* population, also, since knowledge, conviction, and practise in matters pertaining to hygiene were lacking in many localities. Moreover, inasmuch as the plan of school instruction was based on the idea that instruction was to find an immediate application not only in the school life but also in the home and community life, there was danger that passive popular indifference might become active antagonism unless the community became partners in carrying out the plan.

A tabulation of the agencies in the State whose co-operation the department of public instruction might secure showed the following:

AGENCIES AVAILABLE IN THE STATE FOR PURPOSES OF EDUCATION IN HYGIENE

I. State Agencies for Education

1. State Board of Education.
2. Department of Public Instruction.
   - Commissioner of Education.
     - Assistant Commissioners.
     - State Inspector of School Buildings.
     - County Superintendents.
3. State Normal Schools.
4. State Summer Schools.
5. Extension Normal-School Courses.

II. Local School Agencies

1. Boards of Education.
2. City Superintendents.
3. School Supervisors and Principals.
4. Directors of Physical Education.
5. Teachers.
6. School Medical Inspectors and Nurses.

III. Agencies in the State Interested in the Provision of Health

1. State Board of Health.
   - Lecturer on Hygiene.
   - Lecturer on Tuberculosis.
2. State Medical Society.
3. State Sanitary Association.
4. State Dental Association.
5. State Board of Architects.
6. Commissioners of Charities and Correction.
7. State Grange.
8. Local Boards of Health.
9. New Jersey Congress of Mothers.
10. Woman's Christian Temperance Union.
11. New Jersey State Federation of Women's Clubs.
12. New Jersey Sons of Temperance.
13. United Friends' Order of American Mechanics.
14. Patriotic Order Sons of America.
15. Local Playground Associations.

16. Local Civic Organizations.
17. State Agricultural Experiment Station.
18. Princeton University—Department of Hygiene.
19. Rutgers College—Department of Education.

More than half of these agencies have assisted in working out the details of the plan of educational hygiene for the schools. These agencies are influential in the State as a whole and their members are scattered throughout the State.

It has, therefore, already been practically proved that the State has a most valuable asset in its civic organizations, an asset that should not be ignored in any programme of education involving interests which they and the State educational authorities have in common.

Health Education of Adults.—But the general plan of education in hygiene will be only partially carried out when the programme of work for the schools has been completed and distributed, and is operative in the schools with the general approval of the local communities. As before suggested, the time has come for the State department of education to assume responsibilities for the systematic education of those *not* connected with the schools, who cannot be reached directly through them. The theory that the habits of thought and conduct of adults cannot be affected by education is not sound. Opportunities are being offered to adults in many States to learn more about their own trade, or to learn a new one. These vocational school courses are supervised and wholly or in part financed by the State.

There would seem to be no escape from the conclusion that, inasmuch as health is more fundamental than industry, the State must assume responsibility for the maintenance of the public health on as high a plane as it can be maintained. It is not enough to have officers going about enforcing pure-food laws and laws for the protection of water sources. The rapidly accumulating body of knowledge regarding matters of health in all its phases must be brought to the people in such a way that they will become intelligent partners with

the State in maintaining their own health and improving it on their own initiative.

This hygienic intelligence, hygienic conscience, and hygienic practise can be promoted only by the process of education; a process of education that is operative not only in the schools, but continuously and systematically among the adults who do not attend school.

The responsibility for the formulation and carrying out of this twofold or two-sided plan of education in hygiene can rest nowhere but in a State department of public education.

State Supervisor of Educational Hygiene.—To carry out any such plan there should be a State supervisor of educational hygiene. This supervisor should have had training and experience as a physician and as a teacher. He should be competent in the fields of medical supervision, school sanitation, physical education, the teaching of hygiene, and the hygiene of methods of instruction. He should also be a student of sociology, and should be able to stimulate, guide, and help make efficient all phases of school hygiene and the general education in hygiene. In brief, the health of the State is so fundamentally important that the maintenance of it must be assumed by the State. Education in matters of health is the only means of making hygienic practises prevail in the life of each citizen. This education must affect the life of the adult as well as of the young citizen in school. Any general programme of education in hygiene will require in its formulation and for its effective working the co-operation of other State departments interested in matters of health and of all available civic forces focussed in organizations throughout the State. The bigness and the importance of the problem require that its solution be placed in the hands of a supervisor of educational hygiene. One of the prime functions of such a supervisor is to secure this active, guided co-operation to the end that hygienic intelligence, conviction, and practises may be promoted in every community in the State.

CHAPTER X

RURAL SCHOOL-HEALTH ADMINISTRATION

The Rural Health Problem.[1]—Health is the greatest asset in life. Upon it human welfare depends. Not only is health a condition essential to happiness, but it is also of the highest economic importance. Hygiene and sanitation are important phases of sociology, economics, and civics, because whatever affects the welfare of the people affects the welfare of the whole State. Almost one-half of the people of our nation live in rural communities, and the welfare of these people should be considered a vastly important function of the government, because they are engaged largely in the production of the materials which, either raw or manufactured, are the essentials of national life and progress. The more efficient these people are in every respect, the greater the production. Ill health and physical defects on the part of those who produce these materials are not only a loss to the State but a menace to the health of those who use them. The sanitation and health of rural communities are therefore subjects of direct vital importance not only to the rural dwellers themselves but to all.

Health and sanitation being vital factors to the welfare of the people, it is a paramount duty of the State to make a study of these problems to the end that reliable information may be obtained and made available to the people. It is furthermore a paramount duty of the State to exercise supervision over health conditions in order that the causes for disease, physical defects, and ill health may be removed as far as it is possible. Especially should the State make its schools

[1] See also the chapter on "Rural School Sanitation."

a common medium for the dissemination of this information; and in order to render this instruction as effective as possible the school itself should be a model hygienically. The State already considers the training of its citizens academically a paramount duty and compels attendance at school. With such compulsion there ought also to be a provision whereby the State can guarantee a safe and sanitary environment for the young people while they attend. The schools are the *homes of the children* for a large portion of their early years, and to live in sanitary surroundings during those years means the inculcation of a definite *sanitary sense* which ultimately determines the hygienic standard of the home.

Improvement of Health Largely a Matter of Education.—To conserve, to develop, and to enrich human life physically, intellectually, and spiritually, in order that man may reach the highest development of which he is capable, should be the great purpose of education. Hygiene and sanitation are departments of education of vital importance to the welfare and happiness of all. A consideration of what has been done to improve health conditions in rural schools will serve as a basis for considering what can be done in the future. Among the educational agencies which have been instrumental in the betterment of rural schools may be mentioned:

(1) *School-Board Conventions.*—In several States large meetings of school officers have been held for a number of years. In some States these meetings are provided for by law and the officers are paid a per-diem and mileage for attending, while in other States the meetings are voluntary associations or are held in connection with teachers' institutes. A member of the State department of education and the county superintendent are generally in attendance, and thus are afforded excellent opportunities for the department to learn the conditions and needs of the schools and the people. In Wisconsin the statutes give the teachers the right to attend these conventions without loss of pay or time. Phases of school sanitation always come up for discussion

and much has been done, not only to create better school sentiment, but also to spread information regarding methods of managing schools and caring for the health of the children and the community.

(2) *Teachers' Meetings.*—Institutes of various kinds are held in most States and at such gatherings matters pertaining to hygiene and sanitation are frequently taken up. All States provide by law that physiology and hygiene, with special reference to the effects of stimulants and narcotics, shall be taught in the public schools, and this naturally leads to other health topics. Some of the States have, by recent enactment, provided for teaching prevention of accidents. In Michigan the following law was enacted in 1909:

SECTION 1. There shall be taught in every year in every public school in Michigan the principal modes by which each of the dangerous communicable diseases is spread and the best methods for the restriction and prevention of each such disease. Such instruction shall be given by the aid of text-books on physiology, supplemented by oral and blackboard instruction. From and after July 1st, nineteen hundred ten, no text-book on physiology shall be adopted for use in the public schools of this State, unless it shall give at least one-eighth of its space to the causes and prevention of dangerous communicable diseases. Text-books used in giving the foregoing instruction shall, before being adopted for use in the public schools, have that portion given to the instruction in communicable diseases approved by the State Board of Health to the State Board of Education.

(3) *Farmers' Institutes, Community Gatherings, and Rural Organizations of Various Kinds.*—All these agencies are educational and incidentally do much to disseminate knowledge concerning hygiene. Bovine tuberculosis with the possibility of its transmission to human beings has been discussed quite generally and with much vigor at farmers' institutes. Home sanitation is a subject for earnest discussion in local farmers' clubs. The Grange and other rural organizations have been and are always active in spreading information that will better rural conditions. The social-centre move-

ment that has for its object the general use of the schoolhouse for community gatherings is gaining strength and the departments of education in various States are helping by means of bulletins and circulars containing helpful suggestions.

(4) *The School.*—The rural school itself, humble though it may be, is becoming a great agency for influencing the community in the many phases of rural life. It is true that the teaching of hygiene, like the teaching of other branches, has not been productive of the *best* possible results, but the results obtained demonstrate that the rural school can be made a potent factor in improving conditions. In some localities good health habits have been inculcated in children by giving school credit for personal care at home, as outlined in a pamphlet published by ex-State Superintendent E. L. Alderman, of Oregon. The same home-credit plan where tried has been found to exert a strong influence in establishing a proper attitude toward matters of health on the part of the child and sometimes on the part of the older members of the family. One county superintendent during the past year, through his teachers, school officers, and the school-children, made a campaign on the house-fly; another on the care of the teeth; and, through the efforts of another superintendent, all of the school outbuildings of a county were placed in proper condition and kept so throughout the year. Occasionally we find superintendents and teachers taking up specific problems of sanitation with excellent results; and these superintendents and teachers tell other superintendents and teachers what has been accomplished and they are often stimulated to try the same things. Can any one doubt the far-reaching results of such sanitary instruction?

The teaching of physiology and hygiene in the country schools is continually improving: first, because more adequate provisions are made every year for training the teachers; second, better and saner text-books are available; and, third, the courses of study call for simple and practical instruction.

(5) *Literature on Hygiene.*—In addition to the regular

text-books there are many excellent supplementary books, bulletins, and magazine articles dealing with health and sanitary suggestions in a popular way. The libraries contain many excellent books for home reading. In some of the States travelling libraries are sent through the rural communities and these often contain popular works on hygiene. Many of the State boards of health publish and disseminate excellent bulletins dealing with various phases of health. *Public Health*, published by the Michigan State Board, is especially excellent. Tracts, leaflets, and circulars dealing with contagious diseases, the hygiene of children, and other matters pertaining to the welfare of the public are published and distributed according to the needs of each particular State, so far as the funds will permit. Unfortunately, in many of the States health departments are not given the financial support that they should have.[1]

It is also true that the general press of the country is more than ever interesting itself in discussing hygiene and public sanitation. Not only is more newspaper space given to the subject than formerly, but the articles are far better in quality. Though much of the material written on educational and hygienic subjects is not high-class and wholly reliable, the better magazines and periodicals are securing the services of the most eminent medical practitioners and authorities giving information of the highest value.

(6) *Training-Schools for Teachers.*—Much more attention is given now than formerly to the preparation of teachers for rural school work. Though much of this work is yet in a somewhat crude state, yet some success has been achieved in giving to these young teachers some knowledge of the subject-matter, some method, and some definite preparation. A number of the normal schools have introduced special courses for rural school-teachers, and training courses are being administered in connection with high schools. In Wisconsin,

[1] The New York State Board of Health is publishing a health almanac similar to those of Kansas and Virginia.

county training-schools with two-year courses for rural school-teachers have been established. In these special schools much attention is given to instruction in hygiene, physical education, and school sanitation.

(7) *The State Boards of Health.*—Reference has already been made to the literature sent out by these boards. Besides circulating literature, they also do much in educating people directly. Members of boards of health sometimes address teachers' institutes, school officers' meetings, and other gatherings. Through their regular work of inspection they and the local boards do much to impress upon the people the importance of sanitary surroundings. In many of the States the rules of the State board of health have the force and effect of law and many reforms have been brought about, such as the abolition of the common drinking-cup.

(8) *The State Department of Public Instruction and the County Superintendents.*—As far as time and means permit, these educational forces endeavor to secure better sanitary conditions in the school surroundings and profitable school instruction in hygiene. Their responsibility is direct and great.

Improvements that Have Been Made in the Sanitation of Rural Schools.—It is impossible in a short article to go into all the details of improvement in the various States and to give statistical information as to what has or has not been done. It is rather our purpose here to tell of some of the things that have been done administratively by the various agencies mentioned in order that we may be guided in further efforts.

(1) *School Buildings.*—In some of the States provision has been made by law for the condemnation of insanitary school buildings. In Wisconsin this power is given to the inspectors in the department of public instruction, who are delegated by the State superintendent to inspect school buildings when applications come to him for such inspections. In the capacity of State rural-school inspector it has been my

pleasant duty since the law was enacted in 1909 to put out of existence more than eighty health-destroying school buildings. The other inspectors in the department have also had their share in the good work, so that we now have inspected and removed, or improved, over three hundred buildings. The inspectors are empowered to order a new building, or the old one repaired.

In North Dakota the county board of health, of which the county superintendent of schools is a member ex officio, has the power to condemn school buildings, and insanitary school buildings are often ordered discontinued.

Several of the States have made provision by law for the approval of schoolhouse plans by some authority. In certain cases plans are provided by the State and sent to any district desiring to use them. In this way great changes have been made in rural-school architecture and in rural-school conveniences during the last decade. Some State departments of education issue bulletins containing suggestions for remodelling old schools. In numerous instances county superintendents have done excellent work in bringing about improved conditions and there are localities where many new, sanitary, up-to-date rural school buildings are found; and, as a rule, when one such building has been erected several others are built in neighboring districts shortly after. Good things are contagious as well as disease.

(2) *Sanitation of School Buildings.*—The progress that has been made in school sanitation is usually due to one of two factors: (*a*) the educational work that has been done among the people themselves because of suggestions gathered at school-board conventions, teachers' meetings, community gatherings, etc.; (*b*) the State laws that have been passed regulating sanitary conditions, and the proper administration of such laws. Regarding the first agency, Superintendent J. A. Churchill, of Oregon, writes:

> The county superintendents in a large number of counties have taken up the matter of better sanitary conditions by calling parents'

meetings, especially in the rural districts, and making an appeal to the people. As a result of these meetings we have counties in which every rural school building has the windows arranged so that the light comes from the left, where a special system of ventilation is provided or the windows arranged with window-boards, and where the outbuildings are in absolutely sanitary condition. This work has been accomplished through an appeal to the people rather than by compulsion. The State board of health has helped us a great deal in this work by sending lecturers.

In some States, notably Pennsylvania and Indiana, the law provides specifically for the proper sanitary condition of all school buildings. In Indiana regulations have been drawn up in the law for school sites, school buildings, lighting and seating, blackboards and cloak-rooms, water supply and drinking arrangements, heating and ventilation, water-closets and outhouses. A penalty is attached to this law, which reads as follows:[1]

Any agent, person, firm or corporation, selling, trading or giving to any township trustee, school trustee or board of school commissioners, any materials, supplies, sanitary apparatus or systems, which when constructed or remodelled or installed, in or for any school house, hereafter constructed or remodelled, which do not in all respects comply with the provisions of this act, shall be guilty of a misdemeanor, and upon conviction thereof, shall be fined in any sum not more than five hundred ($500.00) dollars, to which may be added imprisonment in the county jail for any determinate period not more than six (6) months and shall be punished by a further fine of not less than five ($5.00) dollars for each day he shall fail to comply with any order of any court having jurisdiction for the correction of any such defects in such school houses hereafter constructed or remodelled; and any money claim for the construction or remodelling, or for any materials, supplies, sanitary apparatus or systems furnished or constructed in or for any school house hereafter constructed or remodelled, which does not in every way and in all respects comply with the requirements of this act, shall be null and void.

(3) *Cleanliness.*—In many sections where school sentiment has been low, cleanliness especially has been at a dis-

[1] See the bulletin of the U. S. Bureau of Education on "Sanitary Schoolhouses."

count. In some States laws have been enacted providing for the cleaning of the schoolhouses. Where such laws have been passed, where school officers' meetings are being held, and where the county superintendent has the energy and ability to do things, we find some excellent conditions. There are localities where most of the school buildings are thoroughly cleaned once a month. At least one State requires, by a vigorous statute, the use of something to keep down the dust in the daily sweeping of all public buildings, including schools. Lest we become too optimistic in this matter, however, let us remember that there are still thousands of rural schoolhouses that do not get more than an annual soap-and-water cleaning; but such are rapidly disappearing.

Maine has on its statute-books a law dealing with the cleanliness of the children themselves. Several other States have similar laws dealing with contagious diseases. The Maine law reads as follows:

> When a teacher becomes aware or suspects that any of the pupils attending his school are in a condition which renders them a source of offense or danger to the other pupils in school on account of filthiness, or because they are the bearers of vermin or parasites, or have an infection or contagious disease of the skin, mouth or eyes, he shall notify the superintendent of schools, and when a superintendent of schools knows or learns that any of the pupils attending any school within his jurisdiction, are affected with any of the conditions, infections, or diseases herein mentioned, he shall notify the parents to cleanse the clothing and the bodies of the children and to furnish them with the required home or medical treatment, for the relief of their trouble, and the superintendent of schools may, when he deems it necessary, exclude such children from the schools temporarily or until they may be cured, cleansed and disinfected.
>
> Parents thus notified of the condition of their children shall forthwith have them and their clothing cleansed and shall promptly do what is necessary, or furnish them such medical treatment as may be required to rid the children of vermin, parasites, or contagion; and any parent who fails to do what is required so that the children may return to school with as little loss of time as is possible, shall be guilty of a misdemeanor and shall be liable to a fine not to exceed five dollars for the first offense, and not to exceed ten dollars for a second or subsequent offense.

(4) *Seating.*—In this matter, as in everything else connected with the country school, progress depends upon enlightenment. Where the most educational work has been done we find the best conditions. There are country schools in which no one could sell any kind of desk except the best. In some localities the people have no knowledge of what is the best and frequently do not care. It is a peculiar fact that some of the worst conditions are often found in communities where the material progress is the greatest, and some of the worst schoolhouses I have seen have often been those in wealthy communities.

(5) *Medical Inspection.*—Some progress has been made in the matter of medical inspection in rural schools. In New Jersey provision is made for the medical inspection of pupils in all schools. The law was enacted in 1903 and is quite complete in its details.

Massachusetts enacted a law in 1906 which makes the following provisions:

> The school committee of every city and town in the commonwealth shall appoint one or more school physicians, shall assign one to each public school within its city or town, and shall provide them with the proper facilities for the performance of their duties as prescribed in this act. Every school physician shall make a prompt examination and diagnosis of all children referred to him, . . . and such further examination of teachers, janitors, and school buildings as in his opinion the protection of the health of the pupils may require. . . . The school committee . . . shall cause every child in the public schools to be separately and carefully tested and examined at least once every school year to ascertain whether he is suffering from defective sight or hearing or from any other disability or defect tending to prevent his receiving the full benefit of his school work or requiring a modification of the school work in order to prevent injury to the child or to secure the best educational results. The tests of sight and hearing shall be made by teachers.

The State board of health prescribes the directions for these tests and furnishes cards, blanks, record books, etc. A booklet has been issued containing suggestions to teachers and school physicians.

From the report of the Massachusetts State Board of Education we find that this law is well enforced in some places, but in regard to enforcement elsewhere the following statements are made:

> In a considerable number of towns no general medical examination of all the children has ever been made. Undoubtedly this general examination is far more important to the school and to the community than the special and casual ones. It reveals defects which have become chronic and which will permanently and vitally affect the welfare of the children. The responsibility for this examination rests directly upon the school committee and not upon the school physician, unless it is specifically included in his contract.

The report shows that where the law is fulfilled excellent hygienic conditions prevail, while in some communities "medical inspection is practically a nominal affair" and "there is no medical inspection worthy of the name."

In Connecticut the law provides that the school board "*may* appoint one or more school physicians and assign one to any public school . . . and shall provide such school physicians, when so appointed, with proper facilities for the performance of their duties." The law is quite explicit as to what shall be done in case physicians are appointed.

The State board of health in its biennial report for 1911–12 makes the following recommendations:

> We have had a law on the statute books for some time permitting school boards to employ medical inspectors. This ought now to be amended so as to make medical inspection of schools obligatory. Some may think it a foolish expenditure of money for which the citizen should not be taxed, but such objections will not bear scrutiny. The authority which has the right to compel attendance at school has the added duty of seeing that no harm comes to those going there, and humanity requires that medical assistance be given children who may suffer through the ignorance or neglect of their parents.
>
> With the lengthening of the school term and the increase in the years of schooling demanded, there has come an advance in the work required. When the standards were low the work was not beyond the capacity of the weaker children, but with fuller courses and higher standards this has changed, and inquiries must be made regarding the

children who do not keep up with their classes, in order to diminish the present economic waste from misdirected educational efforts.

These objects can only be obtained by a system of routine inspection of the children by medical men interested not only in public health but also in education.

In New York the legislature enacted a law in 1913 requiring medical inspection in all public schools. The act also provides for the appointment of a State medical inspector of schools, by the State commissioner of education. The department of education has therefore a real department of school hygiene.

The Pennsylvania law also provides for medical inspection of all schools, but it has a provision to the effect that school districts of the fourth class (which would include rural districts) may decide by vote not to have inspection, and the medical inspection does not come under the jurisdiction of the State department.[1]

In Minnesota, Virginia, and Michigan specialists are employed to visit as many schools as possible. The work that has been done in Minnesota is given in the bulletin, "Organized Health Work in Schools," published by the United States Bureau of Education.

The school law of Utah provides that the teachers of the State shall conduct certain physical examinations of the school-children. These examinations are made under rules prescribed by the State board of health. Provision is also made that the boards of education may employ regularly licensed physicians to make these tests.

The State legislature of Ohio enacted a medical-inspection law in 1913 which makes it optional for school boards to employ one or more medical inspectors. Two or more districts may unite in the employment of one inspector. The provision is made that the inspector must be a regularly licensed physician.

[1] See the Rural School Hygiene Survey by the Editor in the Report on Rural Schools, Superintendent N. C. Schaeffer, Harrisburg, Pa.

(6) *School Outbuildings.*—The toilet facilities in many country schools are inadequate and this results in insanitary conditions. School officers' meetings, the training given to teachers for rural schools, and the enactment of statutes providing specific standards for outbuildings, have much improved conditions in many localities, but in order to bring about proper and permanent results it is necessary to secure the *co-operation* of school officers, teachers, parents, and children. The improvement of conditions in these respects is of itself a phase of the general educational problem.[1]

In the discussion of the above topics attention has been called to some of the things that have been done to improve health conditions in the rural schools. It has not been the aim to give a full account of the conditions as they actually exist. Such an account would have no particular value in connection with this work, but from what has been done we can formulate some plans as to what can and ought to be done, and in planning the work it is well to keep in mind that progress involves:

(1) A *campaign* to interest the people in work of hygiene and sanitation, thus securing their hearty co-operation; and,

(2) The *co-operation* of all agencies and forces having part in the work, in order that the most efficient system of health supervision may be established as described in a previous chapter.

Following are some suggestions made to improve health conditions in rural schools and through them general health conditions in rural communities.

The State departments of education need to be strengthened in many cases. It should be kept in mind that the State superintendent is the educational director for the State. The campaign for better health should be made a part of the regular State educational propaganda, all forces and agencies working under the direction of, or in co-operation with, the

[1] See Dresslar's bulletin on "Rural Schoolhouses and Grounds," U. S. Bureau of Education.

department of education. Enforcement of law depends upon popular opinion and popular will, and these, in turn, depend upon the education of the people.

It is encouraging to note that the State departments in many States have been materially strengthened of late. In Iowa two field workers were added by the last legislature, and in Wisconsin the State superintendent's "official family" now numbers fifteen members. In Alabama the State superintendent has been enabled to secure the services of two rural-school supervisors through an appropriation made by the General Education Board. In many of the other Southern States one or more rural school supervisors are secured through appropriations made by this Board. In many of the States there is now possible a strong organization of the educational work.

With a strong staff the State superintendent can direct effectively a health programme in the schools. He should have the aid of all the educational agencies of the State; and the services of the State university, the normal schools, and all other educational institutions and forces should be at his disposal, so that he may feel free at any time to utilize any specialist that may be adapted for this work.

With the strengthening of the State department of education must come also a higher conception in the minds of the people of the importance of the office of county, district, or local superintendent of schools. This official naturally holds the key to the educational situation in his administrative area. The county superintendent's position is, however, often inadequately provided for, either with funds or with office assistance. With the limited means at their command and the great amount of work to be done, it is, however, surprising that so many county superintendents find time to be the real educational leaders that they are.

The State boards of health need strengthening in many instances, in order that on their own initiative and in cooperation with the State department of education they may

issue publications of an educational, advisory, and administrative character, and also help conduct meetings of various kinds. The two departments working hand in hand can accomplish far greater results than both working alone.

The local boards of health need to be improved in efficiency. In some States there are county boards of health or a county health officer, while in other States the local boards have charge of townships, villages, and cities. Frequently the local officer is a physician, *but often he is not.* In the latter case he usually knows little about his duties and does not have the confidence of the people. In some States it would seem that conditions could be improved by raising the qualifications of the local health official. I have frequently been asked in school-board conventions questions regarding procedure in certain cases. When I have answered that this is a matter for the local health officer, I have received the reply: "He knows no more about the matter than we do." In the appointment of health officers it should be kept in mind also that such officials need to have tact in handling *people* as well as knowledge in handling cases of disease, especially when school questions are involved.

There should be co-operation between the local educational officers and the local health officers. The local school boards should be advised by the local health officers in all matters pertaining to health, and all *orders* of the health officers, State and local, should be enforced by the school officials. The plan of North Dakota to have the county superintendent an ex-officio member of the county board of health seems good. The plan, suggested by the editor of this volume, of having supervisors of hygiene who are physicians and physical educators for rural administrative areas, would make for remarkable rural hygiene development.

A most commendable practice is to have also a local school nurse who gives all her time to the schools within her jurisdiction. Such an officer would be a large factor in establishing the proper relations between the schools and the

homes. She would work under the direction of the local board of education and in co-operation with the health officer and county superintendent. In Wisconsin a law was enacted in 1913 permitting the county board of supervisors to provide for the employment of a visiting nurse. In Pennsylvania any board of school directors may employ one or more school nurses. The rural school nurse will probably come before the rural educational hygienist, except as the latter is employed by the State and very progressive counties.

A reasonably adequate system for health or medical supervision in the rural schools would include the following:

(1) A State board of health with power to make rules that shall have the force of law, this board to work in co-operation with the State department of public instruction in its educational propaganda; and

(2) A State supervisor of educational hygiene, with assistants to act as State inspectors as at present.

(3) A local board of education (preferably county) to guide the work in co-operation with the local boards of health, and school-health officers and visiting nurses to work under the direction of the local board, and all to execute the general orders issued by the State boards of health and instruction.

A steady, sane campaign in behalf of better health is, of course, indispensable, and every opportunity and agency should be utilized to spread information and to create the proper civic sentiment.

The Rural Hygiene Working Forces.—Having roughly sketched a plan for rural school-health supervision, we may next consider its working forces.

The Teacher.—Some inspection and care must always be exercised by the teacher. She should know the symptoms of common contagious diseases and be given authority to send home children having these symptoms, and the cases should then be referred to the health officers.

The teacher should also have some knowledge of physical defects of children, in order that she may be able to de-

tect faults of vision, hearing, speaking, etc., and to determine their probable causes, as well as to suggest remedies. Here, however, is where the great value of the school nurse comes in. Having special training, she can intelligently suggest to the teachers and parents what ought to be done in each individual case. By working with the teacher and county superintendent she can add immeasurably to the health and efficiency of the school and the community. Cases which are too difficult for the teacher to handle can always be taken in hand by the nurse.

The teacher should also be, to a great extent, her own sanitary inspector. A knowledge of the laws enacted by the legislature or rules passed by the State board of health fixing certain hygienic standards for country schools should be a part of her attainments, and it should be the duty of the teacher and the school board, under the direction of the county superintendent, to see that these regulations are complied with. Any intelligent teacher can in a short time read one or more of the new and informing books on school and community health.

The County Superintendent.—An inspection of sanitary conditions can be made by the county superintendent in connection with his visits to the schools. He should have the power to enforce the laws and rules of the State by being *given the power to pass upon a district's right to participate in the apportionment of State school funds.* Cases of physical defects coming to his attention should be reported to the school nurse, the medical inspector, or the parents.

The county superintendent, being the educational leader of the county, should also plan and arrange for the discussion of hygienic topics at teachers' meetings, school-board conventions, parents' meetings, and other gatherings. He should also be a vital factor in training teachers and should frequently visit schools and classes where his future teachers are being educated and trained. The more closely the students can be made to know actual conditions, the better they can be

trained to improve these conditions when they become teachers.

The School Nurse.—If a school nurse is employed, she should become the most important factor in the health supervision of the county or the community. She should make regular inspections of the pupils under her jurisdiction and keep records of their conditions. She should, without delay, visit and inspect localities where epidemics are reported. She should help the teachers and county superintendent in the various meetings. She should follow up cases of ill health or physical defects, and thus become an invaluable help to the parents. Many valuable suggestions will be made to the teachers incidentally and it is easy to see that in a short time the standard of efficiency for the teachers would be raised. The nurse should also be a vital factor in the preparation of teachers for their work and should therefore be an adviser of the faculties having in charge the training of teachers.

The Local Health Officers and Medical Inspector.—If a visiting nurse is not secured, most of the work she would do will have to be assumed by the local health officer. In case a nurse has been secured, the work of the health officer will be largely to act in case of contagious diseases, and to have charge of the legal phases of the problem, such as quarantine, closing school, disinfection, etc. Cases would also be referred to him which might be beyond the power of the school nurse to care for. He should be the chief factor involved in sending defective children to proper institutions and the proper person to take the matter up with the judge who has power to commit individuals to such institutions.

The State hygiene inspectors would be called upon in extraordinary cases only as far as the general administration of the law is concerned. They would, however, spend considerable time in the field studying conditions, in order that the best methods might be adopted, school and rural-life hygiene promoted, and epidemics prevented.

PART III

THE DIVISIONS AND PRACTICE OF EDUCATIONAL HYGIENE

I. MEDICAL SUPERVISION OF SCHOOLS

CHAPTER XI

THE STANDARDIZATION OF THE SCHOOL MEDICAL SERVICE

The Health Census of School-Children.—After a plan of administration is effected, the first problem confronting school-health officials is that of learning the exact health status of all the children in the school system. Until a health census of the pupils has been taken and an accurate diagnosis of prevailing ailments made, school-health agents do not know the problem they are to solve. Accurate knowledge of the physical and mental natures of the children must be the basis of all curative, preventive, educational, and developmental work. For this and other reasons we set medical supervision first among the five divisions of school-health practice. It would probably be more attractive to start with play and playgrounds and the glorification of health and splendid physical development, but the need of carefully examining our difficulties and sizing up the nature of our problem probably outweighs this feature. Too much of our educational work is now done in the dark, with little sense of just what the problem is which confronts us.

We need not trace the history of medical supervision. It started on an active, vigorous course only in the opening years of the twentieth century, although scattered and feeble efforts may be noted before. It was, in this country, an invention of

Doctor Durgin, of the Boston Board of Health, devised for the purpose of lessening the frightful losses due to the various infectious diseases of childhood. Doctors visited the schools at intervals and either went into the classrooms to inspect the children for signs of infectious ailments or had teachers send to the office or doctor's room in the building such children as the teachers suspected of showing symptoms of infectious ailments. This was medical *inspection*, and it has had a wide vogue and has done much good. In many cities teachers have been depended on almost entirely to detect symptoms of ailments and to isolate the children on the doctor's arrival. This system is really teacher inspection rather than medical inspection.

To-day an entirely new spirit has entered into school medical work—the spirit of preventive medicine. Instead of limiting itself to discovering and isolating contagious diseases, an effort is made also to discover and to correct physical defects and incipient ailments before irremediable damage is done, and to place the whole emphasis upon prevention rather than cure. Instead of a slight and passing inspection for the mere signs of infectious ailments, thorough periodic physical examinations of all pupils, and vigorous follow-up, educational, developmental, preventive, and curative work, are carried on. No phase of preventive medicine offers more promise of great development and usefulness than school medical supervision.

In the plan here presented the term inspection is contrasted with examination, and both terms are necessary; consequently a broader term than medical inspection is desirable. In Germany and in a number of cities in this country the term medical supervision has been used for this broader medical work. Some persons have recommended the term health supervision; but this is poor in that it applies to the work of the whole hygiene department with its five divisions. Since medicine is broadening to take in prevention, although the latter is not yet legally a part of the work of medicine

as defined by statute-books according to Doctor Goldwater, there will soon be little or no objection to the term medical, except from the ubiquitous health fakirs. No term so well covers this field, it seems, as medical supervision.

School Examinations and Adult Examinations.—The careful routine and periodic examination of individuals, with occasional less complete inspections and careful advice and preventive work, is not confined to schools alone. Insurance companies have long had examinations, and lately they have quite vigorously entered the field of preventive medicine. If the saving of lives thus effected is profitable to business corporations, how much more profitable to the state is the saving of its prospective citizens! Through the efforts of The Life Extension Institute principally, many business organizations outside of the field of insurance are now taking upon themselves the duty of employing expert physicians to make careful physical examinations, periodically, of all employees. Thousands of employees are now getting such assistance. The examinations are more thorough than those for insurance, including blood pressure, blood analysis, urine and other tests, and a most careful inquiry into habits of life, heredity, and slight symptoms of pathological beginnings.

The disclosures from such examinations are remarkable and in many cases alarming. Doctor S. S. Goldwater, Commissioner of Health of New York City, reports as follows: "Eight hundred garment-trade workers were examined; 62 per cent of those examined were found to be in need of medical treatment. In a similar investigation in Germany fifteen diseases or conditions of physical impairment were found among every ten workers examined. In a recent examination of the employees of a New York City bank 100 per cent of the employees were found to be abnormal and on the sure road to diseases of heart, lungs, kidneys, or blood-vessels."[1]

Doctor Goldwater and others maintain the same position

[1] See also the symposium by Dublin, Winslow, Fisk, and Davenport in the *Popular Science Monthly* for April, 1915.

as that expressed by the writer on the first pages of this volume, namely, that preventive medicine and public health agencies cannot do their proper work and utmost good until qualified physicians, educated in preventive medicine, are employed for the whole population, by the people, for the people; and that such health agents are not merely for the treatment of acute and advanced cases of disease, but as medical advisers and protectors of health, for keeping them well rather than getting them well. More private physicians must become State officials if we are ever to insure the automatic discovery of the beginnings of disease and physical defects, and especially of those various degenerative diseases now increasing in this country.

Such State health examination and education must begin at the beginning of life and continue through all ages. The work of the schools reaching, through school nurses (such as are already employed for adults by health departments and business firms), the children of pre-school age and even infants, are not doing something entirely unique. They are working along the line of a common development which is bound to take place—the socialization of preventive medicine. In Sweden the public medical examination reaches beyond school life for most children, there being an actively enforced law requiring that each minor under eighteen years of age be medically examined annually, at the expense of the government, to determine how far the work in which the youth is engaged may have injured his health. If the examination shows that the occupation has been injurious to the youth's health, he is forbidden to continue, and is given simple vocational guidance of a health character. Halsey says that in 1911 there were 39,971 working children examined, and of these 501 were assigned to more hygienic work, while 81 were absolutely forbidden to continue work and shown how to build up their health. This is a fine beginning. National or State insurance, such as exists abroad in England, Germany, Austria, and elsewhere, is bringing on universal medical

supervision; and the control of occupational, degenerative, and infectious diseases will help it along. Even now the State of Pennsylvania requires at least *monthly* expert medical examinations at the employers' expense of all persons working in the lead industries, and requires elaborate preventive measures in connection therewith.

School medical supervision must, then, unite with the general movement of preventive medicine as its most promising child. This whole movement in general has, according to Goldwater, three essential phases:

"(1) *Education*, which is essential to an understanding of the dangers which the individual encounters.

"(2) *Regulation*, to prevent *environmental* conditions which are inimical to health.

"(3) *Periodic medical examination*, a necessary test of the value and the effectiveness of education and of sanitary regulation."

These measures well describe the work of a school department of hygiene. As we have divided the field, medical supervision of schools limits itself more to the study of the physical and mental condition of the children and the cure of pathological and subnormal conditions. To some extent also the medical examiners, nurses, and workers in clinics are also sanitary inspectors of schools, homes, and community, and educators of children, parents, and public. Usually school sanitation, inspection, and improvement and the education of the children will be done by other than the medical workers. The various phases of medical-supervision work are given below.[1]

The Divisions of Medical Supervision.—The various phases or divisions of the work of medical supervision[2] in this plan and, for the most part, but largely unrecognized, in the best systems now in vogue, are about as follows:

[1] From "School Health Administration," by the writer.

[2] The term will probably remain *medical inspection*, even if it is a misnomer in good systems.

(*A*) Preliminary clinic, for instruction and standardization.

(*B*) Inspections.

(1) Pupil inspections.

(*a*) September *room* inspection of all pupils, by doctors and nurses.

(*b*) *Occasional* room inspections of classes of children, by nurses.

(*c*) *Individual* inspection, by teachers, nurses, and doctors.

(2) Environmental inspections.

(*a*) *Home hygiene* inspection, during home visits of nurses.

(*b*) *Sanitary* inspections of the *school* premises, by any delegated and competent officer.

(*C*) Examinations, complete physical, annually for all pupils.

(1) *Scholastic:* vision and hearing examinations, and perhaps others, by the nurses.

(2) *Medical:* only those technical phases which the nurses cannot do well, if any, by doctors.

(3) *Psychological:* in special cases where mental defectiveness is suspected, by psychologists.

(4) *Anthropological:* measurements of height, weight, chest-expansion, and the like, only *if required.* Of doubtful value as usually made and followed.

(5) *Work certificate:* will probably not be needed in well-conducted systems, since the pupil's health condition is always well known; but vocational guidance may play an important part here.

(*D*) Treatment, cure, and correction.

(1) By home and family physicians, dentists, or oculists.

(2) By school nurses.

(3) By dispensaries or other free clinics.

(4) By public-school clinic, with various divisions.

(*E*) Prevention.

By looking for causes, co-operating with other divisions of educational hygiene, and other public and private health

agencies, and by placing the emphasis upon *preventive* rather than merely *curative* agencies.

How to carry on efficiently and economically these different phases of the work will be the problem of this chapter.[1]

(*A*) *The Preliminary Standardization Clinic.*

In the typical city for which the reorganized expenditures were given,[2] with a proportion of little over 3 per cent of current school expenditures for the entire department, including medical inspection, we have two physicians and three nurses for 6,000 pupils from kindergarten through high school, 3,000 for each physician (one, the director), and 2,000 for each nurse. For a city of 12,000 children we should have, of course, twice as many nurses and three assistant physicians. But no matter how large or how small the department may be, even one physician and one nurse, there should be, when they begin to work together, and, if several, at the beginning of each year or oftener, *a meeting at which children are examined or inspected, or both, and standards for referring cases to parents, for exclusions, for readmissions, for best methods of doing the work, and the like, are discussed.* Teachers and principals may be present at such meetings, and all may take a hand in coming to some common agreement, without which there will, in isolation, develop the greatest irregularity among different workers and frequent injustice to children and parents through conflicting standards and methods.

This is also the opportunity for the supervisor to outline the work of the year, and to get suggestions from all concerned as to its improvement. It is a time for inspiration and education. All need them. Such clinics can be held at one or more of the several schools, if desired, or at teachers' meetings, for the purpose of giving the teachers necessary elements of child-study of a medical character, which prob-

[1] See Hoag and Terman's "Health Work in the Schools," pages 16 to 25.
[2] Chapter VIII.

ably never appeared in any course in their professional preparation.

No city known by the writer now employs this means for making efficient medical supervision, and he hopes for its speedy experimental testing. Besides these will come, of course, monthly or semimonthly department meetings, which are now quite common in good systems.

(*B*) *Inspections.*—(1) *Pupil Inspections.*

(*a*) *September Classroom Inspections.*—Since this plan of administration gives the physician as many pupils as he can *examine* in the entire year, beginning in September about the third week, and taking pupils in the same order each year, we must provide what many cities have been driven to by hard experience, namely, a preliminary, complete, routine, *classroom* inspection of all pupils. With 3,000 pupils, each pair of nurses and physicians will have about seventy-five rooms, counting 40 pupils to a room. By requiring the part-time physicians to spend three hours a day in this first general inspection, and with the nurses all at the same work, counting a classroom, after practice, for each half-hour, and records made, where two work together, we can see that the inspection of all children can be made in about two weeks.

Some doctors lay claim to 250 pupils room-inspected an hour, but these are only very partial inspections, for signs of parasitic or infectious disorders. This first general routine inspection would make a fair substitute for an examination, especially if there were any careful attention given to vision and hearing. It is a general inspection of the child for any *serious* defects, ailments, or conditions which should receive early treatment and care. No vision or hearing tests, as such, are made, but all obvious cases, like strabismus (cross-eye), or inflamed eyes from eye-strain, may be recorded and referred with instructions.

The principal ailments found will probably be minor skin ailments of a filth or infectious character, although most

ailments will be represented. If there have been nurse inspections during the summer, fewer cases will be found, but there are always sufficient numbers to warrant rigorous measures for nipping their spread in the bud.

The Method of Classroom Inspections.—The central instrument in all medical supervision ("inspection") is the *individual, cumulative health-record card of each pupil.* On it is recorded the health history of the child during his school years, and in some cases for the years previous to his entering school. The development of the science of educational hygiene and the practical control of health matters must very much depend upon such individual health histories. Scientific control of living conditions of children, or of any other phenomena, rests upon the basis of accurate and carefully selected facts. We present herewith the faces of two such health-record cards devised by the writer. For complete descriptions and standard keys the reader is referred to the tentative standard plan above mentioned.

The physician should usually make this first inspection while the nurse records and observes the work of the physician. Only the more severe cases, the infectious ailments, parasitic ailments, and the like, should be recorded and referred or excluded at this time. Vision and hearing need not be tested, and heart and lung examinations need not be made except in special cases.

Care should be taken to record and attempt to get treated and cured only real and severe cases. Doctors have a tendency to defeat their efforts by referring very minor and insignificant ailments. Better concentrate on important cases and succeed in getting them cured. This inspection of all children may be made in the rooms or in the halls outside the rooms. Nurses can do the work quite well when trained, and teachers may help with the record work by the use of the code given on the weekly report by numbers. Exclusions should be made for diphtheria, sore throat, tonsilitis, scarlet fever, whooping-cough, chicken-pox, measles, mumps, tra-

choma, and other acute infectious diseases, and such parasitic and minor infectious ailments as prove necessary. Every effort should be made to keep children in school, and it should never be necessary to close schools. Pediculosis, impetigo, and such ailments may be treated at home or school, and the children kept in school. In several cities school janitresses handle pediculosis cases.

The nurse may make out the exclusion slip, which should be simple, dignified, and adequately instructive. If the back can be used for health advice, the chance should not be missed. The seal of the city printed on each, as is done in the State forms of Massachusetts and certain cities, will appeal in the right way to many parents. The following exclusion form has several advantages in the way of economy:

EXCLUSION RECORD

No.....

Date....., 191..

School..... Room.....

Pupil.....

Address .....

Cause of Exclusion:

.....

.....

Readmitted,

....., 191..

School days lost.....

MEDICAL SUPERVISION OF SCHOOLS

Health City, New Jersey.

Date....., 191..

School..... Room..... Grade.....

Pupil's name.....

Home address.....

The above-named pupil is hereby ordered to discontinue attendance at school temporarily for the following reasons:

.....

.....

.....

School Nurse, M.D.

(Hand to pupil excluded.)

[over]

This entire form need not be more than six inches long and two and a half inches wide.

On the back of the long part, not the stub, should be printed these and any other directions, general advice, or short article from city or State laws:

The ailment mentioned on the other side of this notice is infectious (contagious), and liable to be transmitted, or "given," to other children. The child should receive prompt treatment by a physician or the school nurse, and should return to school..... 191.., for inspection by the school physician or nurse. If found free from infection he may then resume attendance at school.

Every reasonable effort should be made to give each child the full benefit of every possible day of school attendance.

A Duplicate Book for Doctor and Nurse.—This form, separable from its stub, should be printed as is a check-book, and, whenever desirable, as in the case of acute infectious diseases, will, with small sheets of copying carbon, give four forms, the original for the parent, the stub for the hygiene department, the carbon copy for the board of health as their notification, and the carbon stub for the nurse's or doctor's record. The notice can be sent home in several different ways, depending upon circumstances. One of these exclusion books should be kept in each school, and for its pupils only.

To avoid conflict of jurisdiction, the city health officer and the director of hygiene, or superintendent, should meet and agree upon a plan of co-operation for readmitting pupils after exclusion or illness absence.

Reporting the Room-Inspection.—When the class has been room-inspected, the nurse will take all the cards of ailing pupils to the principal's office or the health-room, where they can be reported after the morning's work with the physician. In her case-book for each school she will write down the name, address, room, and ailment of each defective and ailing child and the date. When she sends notices home with the children who are ailing but not excluded and gets no satisfactory results in treatment within three days or a week, the time for a second notice, or for home visiting, has come, which may even end with the doctor's visit or that of an officer of the law. After the list of cases has been placed in her book the cards can be returned to the room, where the teacher will give them a *separate* place in her file, or mark

INDIVIDUAL HEALTH RECORD CARD, NUMBER ONE (ORIGINAL, 5 x 8 INCHES)

NAME: SURNAME — HEALTH RECORD SCHOOL: — DATE OF BIRTH: , 19

ADDRESS: — Healthville Public Schools — ROOM

PHONE:

X=Needs treatment, referred. ⊗=Cured. ○=Improved, not cured. ✓=Minor, not refer. E=Excluded. R=Readmitted. Nurse uses Red Ink.

Always bring this Card to the Examination or Inspection

	Date of Examination		Remarks:		Remarks:		Remarks:		Remarks:		Remarks:	
1	Adenoids or N. Obstr.											1
2	Anemia or Malnutr.											2
3	Deafness, Def. Hearing											3
4	Dental D., Teeth											4
5	Enlarged Tonsils											5
6	Eyesight, D. Vision											6
7	Glands, enlarged											7
8	Heart or Lungs											8
9	Nervous, Chorea											9
10	Skelet., Curvature											10
11	Other Phys. Defects											11
12	Digestive System											12
13	Ear Ailments											13
14	Eye Ailments											14
15	Respiratory Tract											15
16	Skin Ailments											16
17	Skin Ailments											17
18	Wounds, Sores, etc.											18
19	Other Common Ail.											19
20	Other Common Ail.											20
21	Communicable Ail.											21
22	Communicable Ail.											22
23	Communicable Ail.											23
24	Communicable Ail.											24
	Days lost thru Illness:											X

CARD NUMBER ONE. BACK

NAME _____ History of: Measles _____ Scarlet Fever _____ Diphtheria _____ Whoop. Cough _____

NATIVITY _____ (SURNAME) Chickenpox _____ Others _____ Vaccinated _____ ROOM

X=Needs treatment, referred. ⊗=Cured. ○=Improved, not cured. ✓=Minor, not referred. E=Excluded. R=Readmitted. Nurse uses red ink

Always bring this Card to the Examination or Inspection

	Date of Examination				Remarks			Remarks			Remarks
1	Adenoids or N.O.										
2	Anemia or Malnutr.										
3	Deafness, Def.Hear.										
4	Dental D., Teeth										
5	Enlarged Tonsils										
6	Eyesight, D.Vision										
7	Glands, enlarged										
8	Heart or Lungs										
9	Nervous, Chorea										
10	Skelet., Curvature										
11	Other Phys. Defects										
12	Digestive System										
13	Ear Ailments										
14	Eye Ailments										
15	Respiratory Tract										
16	Skin Ailments										
17	Skin Ailments										
18	Wounds, Sores, etc.										
19	Other Common Ail.										
20	Other Common Ail.										
21	Communicable Ail.										
22	Communicable Ail.										
23	Communicable Ail.										
24	Communicable Ail.										
	Days lost thru Illness:										

HOME HYGIENE INSPECTION						
Grade						
Date						
Children in School { Boys / Girls						
Number of rooms						
No.of bed rooms						
No.of beds						
Bath tub?						
Ventilation, G-F-B						
Light, G-F-B						
Cleanliness, G-F-B						
No.of families using closets						
Financ., G-F-B						
Nourishment, G-F-B						
Children's hours of sleep						
Home study opportunity, G-F-B						
Mother						
Father						
Sisters						
Brothers						
Boarders						
Cooperation with school						
Used the Dispensary						

Healthville, N.J. **MEDICAL SUPERVISION** WEEK ENDING OVER 19

PUBLIC SCHOOLS

General Summary

M.D. NURSE

			MONDAY	TUESDAY	WED'SDAY	THURSDAY	FRIDAY	SATURDAY	TOTALS	REMARKS
Schools Visited, No's.		M.D.								
		NURSE								
Time Spent in Schools		M.D.								
		NURSE								
Number of Classroom Inspections		M.D.								
		NURSE								
Number of Individual Inspections		M.D.								
		NURSE								
Number of Pupils Examined		M.D.								
		NURSE								
Number of Pupils found Defective	NEW	M.D.								
		NURSE								
	OLD	M.D.								
		NURSE								
Number of Ailments found	NEW	M.D.								
		NURSE								
	OLD	M.D.								
		NURSE								
Number of Ailments Treated		NURSE								
		OTHER								
Number of Ailments found		CURED								
		IMPROVED								
Number of Pupils		EXCLUDED								
		READMITTED								
		UNVACCINATED								
		VACCINATED								
Number of Home Visits		M.D.								
		NURSE								
No. Pupils Taken to Dentist, Clinic, Dispensary, M. D. or Oculist										
No. Deaths of Pupils										
Number of Health or Medical Talks or Lectures		M.D.								
		NURSE								
		OTHERS								
No. Pupils with Teeth Defects only										

Directions for Making the Weekly Report

General Notes to Supervisor of Hygiene

DETAILED REPORT OF AILMENTS

OVER

"New" = first found in school year. "Old" = ailments previously reported—before this week.

		NUMBER OF AILMENTS MET DURING THE WEEK BY DOCTOR AND NURSE	MON		TUE		WED		THU		FRI		SAT		TOTALS			NEGATIVE SUBTRACT	FOUND BY		TREATED BY		FOUND CURED		FOUND IMPD		NO. OF PUPILS EXCL. FOUND NEED NOT RETD	GRAND TOTAL OF NO. AILMENTS TO DATE		
			OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	GRAND TOTAL		N	MD	N	MD	O	OLD	NEW	OLD	NEW		FOUND	CURED	NOT CURED
COMMUNICABLE AILMENTS — INFECTIOUS DISEASES	1	ADENOIDS, NASAL OBSTR.																												
	2	ANEMIA																												
	3	DEAFNESS, HEARING																												
	4	DENTAL, TEETH																												
	5	ENLARGED TONSILS																												
	6	EYESIGHT, VISION																												
	7	EYES CROSSED, STRABIS.																												
	8	GLANDS ENLARGED, ADEN.																												
	9	HEART DEFECTS																												
	10	LUNGS WEAK, NOT TUB.																												
	11	MALNUTRITION, DEBILITY																												
	12	MENTALITY DEF.																												
	13	NERVOUSNESS, CHOREA																												
	14	PALATE DEFECTS																												
	15	SKELETON, ORTHOPED.																												
	16	SPINE, CURVATURE, ETC.																												
	17	SPEECH DEFECTS																												
	A																													
	B																													
	C																													
NON-COMMUNICABLE AILMENTS — COMMON AILMENTS	18	ABSCESS, BOILS, ETC.																												
	19	ACUTE SORE THROAT, ETC.																												
	20	BRONCHITIS																												
	21	CLEANLINESS NEEDED																												
	22	CATARRH, RHINITIS																												
	23	COLDS, BAD, CORYZA																												
	24	EAR DISCHARGE, OTITIS																												
	25	EARS: MINOR																												
	26	ECZEMA																												
	27	EYES: MINOR																												
	28	HEADACHE, A SYMPTOM																												
	29	LARYNGITIS																												
	30	NOSE BLEED, EPISTAXIS																												
	31	PHARYNGITIS																												
	32	RHEUMATISM																												
	33	SEX AILMENTS																												
	34	SKIN: MINOR																												
	35	STOMATITIS																												
	36	WOUNDS, SORES, ETC.																												
	37	URINARY, ENECURESIS																												
	D																													
	E																													
	F																													
COMMUNICABLE AILMENTS — MINOR & PARASITIC	38	CONJUNCTIVITIS, PINK E.																												
	39	FAVUS																												
	40	IMPETIGO																												
	41	INFLUENZA																												
	42	PEDICULOSIS, LICE																												
	43	RINGWORM																												
	44	SCABIES																												
	45	TONSILITIS																												
	G																													
	H																													
	I																													
COMMUNICABLE AILMENTS — INFECTIOUS DISEASES	46	CHICKEN POX																												
	47	DIPHTHERIA																												
	48	MEASLES																												
	49	MUMPS																												
	50	SCARLET FEVER																												
	51	TRACHOMA																												
	52	TUBERCULOSIS: LUNGS																												
	53	TUBER. OTHER PARTS																												
	54	WHOOPING COUGH																												
	J																													
	K																													
	L																													
	M																													
		SUM TOTALS																												

NOTE.—Detailed directions for the use of the forms of this chapter may be found in the editor's volume on "The Administration of School Medical Inspection," published by Teachers College, Columbia University.

INDIVIDUAL HEALTH RECORD CARD, NUMBER TWO (ORIGINAL, 5 x 8 INCHES)

NAME: HEALTH RECORD SCHOOL:

ADDRESS: SURNAME Healthville Public Schools ROOM:

PHONE: DATE OF BIRTH: , 19

X= Needs treatment, referred. ⊗ = Cured. ○ =Improved, not cured. ✓=Minor, not refer. E=Excluded. R=Readmitted. Nurse uses Red Ink.

Always bring this Card to the Examination or Inspection

First Year									
Second Year									
Third Year									
Fourth Year									
Fifth Year									

them with colored clips. At the end of the day the nurse will record all the work of inspection and the findings in the column for that day's work, on the weekly report form. This daily and weekly report will be treated under "examinations."

(*b*) *Occasional Room-Inspections.*—Occasionally other room-inspections (*special* room-inspection is a good term) must be made by the nurse after the routine one in September. Very rarely will the doctor be needed for such work. The method can be that of the general inspection described, or she can simply pass along the aisles and inspect the children. The latter can have their hands on the desks, and the nurse, passing along from the rear, can easily note the condition of the hair and scalp, as well as other features. The nurses of Newark made an average of nearly 500 occasional classroom inspections each during the school year studied by the writer, besides about 21,000 individual inspections and over a thousand home visits each. These room-inspections are especially valuable in poor or foreign districts in bringing up the health and cleanliness standards toward those of civilized America. They are also valuable, as suggested, in the case of an impending epidemic.

(*c*) *Individual Inspections.—Individual* inspections are to be made principally by the nurse, but also, if necessary, by the physician in the one building he visits for two or more hours each day. Only *urgent* cases are to be referred either by nurse or teacher to the doctor. The principal classes of individual inspections are as follows:

w. Pupils referred at the time of the nurse's visit, by the teachers.

x. Pupils entering that school for the first time, any age.

y. Pupils who have been out of school for any reason more than three days, especially excluded, or quarantined cases.

z. Pupils brought to the attention of the nurse in the homes.

Where principals are, or become, qualified, a large number of the readmittance inspections may be left to them.

The importance of the health training of principals and teachers, and the books they can use in study, will be brought out later. A principal who hasn't such a knowledge of children (child-study) needs to "study up." He must, however, beware of cocksureness after little study.

The usual place for the individual inspections is at the health-room or the principal's office. A bell is rung indicating the nurse's arrival. A school janitress or a good principal's clerk may be of great assistance in getting the children ready. Each child will come with his health-record card in a fold of clean paper, and on this paper may be written the teacher's reason for sending in the pupil. He may be suspected of some ailment, or the teacher has noticed that he is not getting the treatment previously recommended, or for many other reasons, except as punishment. The nurse inspects the child, and, unless he is excluded, sends him back to his room, with a note to the teacher about the case on the same folder-protector of the card. The teacher may clip small memoranda slips on the cards of pupils who have not yet obtained treatment, or put these cards in a special part of her file, or she may use the various colored clip-markers for card indexes, each color of which may be given a standard meaning, as before mentioned.

The *symptom chart* prepared by Doctor E. B. Hoag and printed in his "Health Index of Children," and separately, or some other set of indices to school ailments, such as are used in Cleveland, or printed by the writer in *American Education*, or those given by Doctor Wood in his "Health and Education," will be of great assistance to the teachers in locating the children needing to be referred to doctor or nurse.[1] Most of the present work of medical inspection is really *teacher* inspection, since most of the cases are first noticed by the teachers and then sent in to the doctors. With all this responsibility, the teachers have not been given a square deal in the way of health instruction in the form of lectures,

[1] See also the bulletin of the U. S. Bureau of Education, no. 524, pp. 130–131.

clinics, teachers' meetings, or books, by which to fit themselves for their serious responsibility; and their normal or college courses have never, in most probability, even touched upon such matters. "The child," to their professional training institutions, was quite largely a disembodied mentality, and psychology was the only study of his nature.

DIAGNOSTIC TABLE, OR SYMPTOM CHART

Disorders and Their Indications

(to be observed by teachers, nurses, and parents)

Teeth Defects

Decay of teeth.
Discoloration.
Crooked teeth.
Prominent teeth.
Offensive breath.
Poor articulation.
Broken teeth.
Malnutrition.

Disorders of Nose, Throat, and Ear

Mouth breathing.
Prominent upper teeth.
Loud breathing.
Nasal voice.
Catarrh.
Running nose.
Frequent colds.
Sore throat.
Offensive breath.
Cough.
Blank expression.
Slow mentality.
Deafness.
Poor physical development.
Earache.
Discharge.
Inattention.
Poor spelling.
Watching of lips.
Slow progress.
Headache.

Eye Disorders and Defects

Sore eyes of any kind.
Sties.
Congested eyes.
Crossed eye.
Squinting.
Headache.
Peculiar postures when reading.
Holding book too near face.
Poor reading or spelling.
Dizziness.

Infectious Diseases

Pallor.
Flushed face.
Vomiting.
Headache.

Eruptions.
Scratching.
Sleepiness.
Lassitude.
Cough.
Running nose.
Congested eyes.

Nervous Disorders

Inability to hold objects well.
Spasmodic movements.
Twitching of eyes, face, or any part of the body.
Irritability.
Fits.
Bad temper.
Fainting.
Nail-biting.
Undue emotion of any sort.
Frequent requests to "go out."
Timidity.
Stammering.
Cruelty.
Perverted tastes.
Moroseness.
Solitary habits.
Undue embarrassment.
Undue activity.
Misbehavior.
Sex perversions.

Nutritional and General Disturbances

Pallor.
Emaciation.
Enlarged glands in neck.
Puffiness of face or eyes.
Shortness of breath.
Lassitude.
Perverted tastes (*e. g.*, food).
Slow mentality.
Peculiar or faulty postures.
Underdevelopment.
Excessive fat.
Vicious personal habits.
Low endurance power.
Irritability.
Disinclination to play.
Fatigue.

Defects of the Feet

Walking "pigeon-toed."
A shuffling, inelastic walk.
Toeing markedly out.
Advancing foot by exaggerated knee action.
Long axes of foot and leg meet at unusually wide angles.
Shifting from foot to foot.
Standing on outer edge of feet.
Locking knees.
Leaning against wall or desk.
Shoes run over at either side.
Front of heel worn down.
Outer and back part of heel worn down.
Wearing out of soles asymmetrically.
Congestion of the feet.
Swelling, puffiness.
Excessive perspiration.
Callouses.
Twitching of the foot muscles.

INCORRECT POSTURE

Unequal height of shoulders.	Flat chest.
Standing on sides of feet.	Curved back.
Prominent abdomen.	Stooping.

If this chart of symptoms devised by Doctor Hoag is printed on a heavy card and furnished each teacher, she will be given much assistance in doing her part. See his "Health Index of School Children" mentioned above.

(2) *Environmental Inspections.*—After *pupil* inspections, according to our outline, come environmental inspections. *Home visiting*, or home hygiene inspection, by nurses is about their most important work, and the problem of *school sanitation* will soon come up in any thorough system of medical supervision. The home-hygiene inspections at the time of the nurse's home visits are becoming exceedingly valuable citizen-making institutions, and no words here can indicate the spirit, the possibilities, or the methods of that humane and scientific work. We arrange for the records of such visits in cipher on each individual record card. Each nurse should obtain Doctor Hoag's or Doctor Cornell's book, and, at least, a book probably now published by the first municipal school nurse of America, Mrs. Lina Rogers Struthers, R.N., recently superintendent of school nurses at Toronto, and formerly of New York City. Doctor Dresslar's book on "School Hygiene" is also a desirable volume on the whole field.

In certain small cities the experiment has been successfully tried of making the nurse the attendance officer also (thus saving another salary as related), so that she can go to a home and handle a case of truancy effectively, as any other school "case." The possibilities have not yet been half discovered in this whole field of home visiting. Even where there are attendance officers, the nurse becomes their most valuable assistant.

School sanitation inspection is more naturally the work of the superintendent, director of hygiene, principal, and

business manager; but the nurse and the physician should know enough about the subject from such texts as Shaw's or Dresslar's books on "School Hygiene," or the other books mentioned, to do effective work in calling to their attention as often as is necessary evil conditions of lighting, cleaning, heating, ventilating, the condition of toilets, the necessity for play, playgrounds, and play apparatus, sanitary drinking-fountains, the proper kind of dusting, and all such matters.

The Board of Health of Philadelphia has a special card form for recording the facts of school sanitation, and Doctor Hoag has a portion of his book and a pamphlet devoted to a "Sanitary Survey of Schools," which is of great assistance to the amateur.[1] Quite frequently the nurse or the school physician will observe unhealthful conditions not noticed by teachers or principals and, then, may be even more successful than they in remedying these conditions. It depends upon who has the ability to translate private opinion into public opinion and private scientific knowledge into public action.

(*C*) *Examinations.*

There is no need of calling these *physical* examinations except where the word examination is (badly) used for inspection. We have suggested that a thorough, routine room-inspection of children for all ailments of a serious character, recorded on the health-record cards, is very much like an examination. It is, however, not so individual, so intensive, and so technically diagnostic. Inspections will frequently overlook decayed teeth entirely, and will never include routine vision or hearing tests, nor will they ever require, perhaps, the stripping of each child to the waist, as a matter of routine and without suspicion of some heart or lung ailment. An *examination* should be a patient, scientific investigation of a child's health status, regardless of whether he is suspected of having

[1] Whitaker and Ray-Wiggin Co., San Francisco, or Paul Hoeber Co., 69 East 59th Street, New York City. See also the New Jersey form of 114 points in the U. S. Bulletin, no. 524, pp. 127–129, and the form used by Doctor Ayres in the Springfield (Ill.) School Survey, given earlier. For rural schools, Doctor Dresslar's government bulletin on "Rural Schoolhouses and Grounds."

an ailment. Such examinations should not be painfully long and impractical, however, in their minutiæ. Quick, accurate, and thorough observation and judgment can be developed in this field as in any other. Much will depend upon the physician and the nurse and what they have in their minds as questions and problems regarding each child's health condition.

The examinations should be made in the health, or medical, room. This should be about half the size of an elementary schoolroom (25 by 16), and be well lighted. It should have both hot and cold running water, a toilet adjacent, facilities for a combination tub and shower bath, a couch, several chairs, an anteroom for those awaiting examination, filing cabinets for case cards (for systems needing them), a table or desk or two with drawers, a medicine cabinet, a white-enamelled iron-and-glass stand, white-enamel wash-basins, and the various test-cards, medicines, and the like needed by nurse and physician. Types of equipment and supplies are given in a former chapter. Many schools add to these a platform scale, usually a "Jones," with height standard attached. Its necessity as a matter of general routine for all school-children is yet to be demonstrated, however.

The Method of the Examinations.—As suggested, it will probably be best for the nurse to be present each day during the two hours or more of the examination, so she can confer with the physician over cases and help in handling the children, making the vision and hearing tests, taking the records, etc., as can best be arranged. Scientific management in business does some of its best work with seemingly minor details of daily practise. There is great opportunity for the practise of its principles in medical supervision and especially in the examinations. This condensation of the plan, however, must limit itself to bare essentials, in order not to exceed all space limits.

We have urged that the vision and hearing examinations, once a year or less often, as is found better, be given by the nurse and not by other persons; and that she do this, as

much as possible, at the time the physician of her district makes his two-hour daily visit to some one school. One nurse will work with the physician at all times, while the extra nurses will devote themselves to inspections and home visiting.

Here, at the ringing of the bell which indicates the physician's arrival, or before, children suspected of having serious ailments or who for some reason require immediate attention are sent by the teachers or nurse to the health-room. At the same time pupils of the lowest grades, a room at a time, are sent, by threes, to the health or medical (inspection) room. The nurse quickly inspects the serious cases, referring to the doctor for further inspection such as are puzzling, and then disposes of the first group. If desired, they may be *examined* at this time.

She then prepares, as may be necessary, a child (of the three mentioned) for the doctor's examination, calling his attention to any ailments or history of the child familiar to her and necessary for him to utilize, and begins, herself, to test the vision and hearing of another child. By the time the doctor is through with his medical examination she will perhaps be through with these two tests, and all can be recorded on the health-record card of the pupil, exclusions can be made, or notices to parents regarding serious physical defects or other ailments signed. Each case (name of child) will be placed in her case-book, or on a case-card on file in the health-room or principal's office. Such cards for defective pupils are found necessary in many cities. The one used by Newark is sent to the "department of medical inspection" when the case is concluded. Cards not sent in by the end of the school term are used for follow-up work in the summer. Whenever a case is concluded, the teacher should be notified. The word "case" is frequently used to mean both a single child and all his ailments at any one time, and again each one of the ailments found, so that a child might be six or more cases at once. If the term is used (and it probably should not be), it should refer only to

one child with all of his ailments, whether one or many, at any one time. Usually every *new ailment* he gets will make another case. Then, instead of recording the number of "cases," the number of different *ailments* should be given, and for a large group of children there will always be more ailments than pupils—probably, on the average, two or more to one.

The time of the examination should preferably be from nine to eleven each day, and each day in a different school during a week or longer, depending upon the number of schools it takes to supply about three thousand children, and somewhat upon the locality, of course. Perhaps two thousand for the doctor and the same or fewer for the nurse may be found desirable in a poor, foreign district. For small schools the doctor's visits should be distributed over the year. A school with 200 pupils will mean about ten visits, or one every three or four weeks. Compromises may be made here.

"If the nurse and doctor go to the same school, how can we have inspection at other schools each day?" some one may ask. This is one of the reasons for the extra nurse in the typical city. She will do this work. Otherwise, the principals and teachers must use their discretion, as they have done for so long, until the nurse can come in the late morning or in the afternoon. Some of these daily inspection visits she can avoid by telephoning to a school and finding whether the teachers *have looked* and found any urgent cases. On schedule, she will probably get to one or two of these other schools each afternoon anyway.

We cannot go into further details with respect to the examinations of various kinds, psychological, scholastic, dental, and others. There is little need of dentists making dental examinations when nurses and doctors give the necessary care to this part of the complete survey of the child. Directions for making vision, hearing, and mental tests may be found in other works.

Whenever a referable, non-infectious ailment is found during inspection or examination, the following note to par-

ents may be filled out from the cards and enclosed in an envelope by the nurse to be sent to the parents:

Medical Supervision of Schools,
Health City, N. J.

NOTICE TO PARENTS OR GUARDIANS

This notice does NOT exclude the pupil from school.

Date....., 191..

The parent or guardian of.....
is hereby informed that a physical examination by the school physician seems to show that this child is suffering from.....
..... You are advised to take this child to your family physician or a.....specialist, for advice and treatment as soon as possible, in order that the pupil may be better fitted to do successfully and without injury his school work.

.....
School Physician.

This notice may be placed on a card of a certain color, say yellow, and about 5½ by 3¼ inches in size. Some send all such messages by post, but this is in most cases a needless expense.

On the back of the card may be printed a permit by the parent for the nurse to take the child to a clinic or physician for medical or surgical treatment, and an alternative statement that the parent has *had* a physician and the result of the visit, somewhat as follows:

PLEASE SEE THAT THIS CARD IS RETURNED TO THE TEACHER

This pupil was seen by Doctor.....on
....., 19.., with the following result.....
.....
.....
Signature of parent or guardian,

.....

I desire the school nurse to escort my child to.....
.....
for medical or surgical treatment of the.....
Signature of parent or guardian,

.....

If the parent does not respond within three days, and an inspection at that time by the nurse shows no evidence of satisfactory treatment, another notice should be sent.

If this notice is not heeded, and it should be printed and worded in such a manner as to command attention and get results, the nurse may visit the home to help the parent see the need of the treatment or to explain and arrange with her the free treatment at some dispensary, the school clinic, or other similar place. If the nurse is unable to get the treatment, and cannot do it herself, the physician, principal, or teacher may attempt the matter.

So many parents are so poor and so ignorant, and the provisions for treatment are so inadequate or unsatisfactory, that men and women in the school medical service are soon driven to see the absolute necessity of an adequate *school clinic*, with an oculist to make eye examinations and prescribe and, at times, furnish free glasses, dentists for dental service, and surgeons for operative work. The surgeons or the nurses attached, or a school physician, can make such treatments as are necessary—those for ringworm of the scalp with X-rays possibly, for favus, for trachoma, adenoids, tonsils, etc.—and, with the help of the physical-education division, can give such medical gymnastics as are needed for orthopedic, mouth-breathing, and other cases. The need for an open-air school, and outdoor cooler ("uncooked") and moister air in the classrooms, will also soon be made manifest in even the best of cities.

As the examinations extend through the entire year, and the graduating class of February may not be reached by that time, it will be well to give this class an examination early in the term. Other children who may also be examined out of turn are: all the children of a family when a parent has come to the examination, as suggested, children going into athletic contests (very important in some cities), children who are especially referred to the physician by the nurse, or to the nurse by the teacher, and children who have entered

school, or *that* school, for the first time after the pupils of their rooms have been examined.

Not only parental visiting at the examinations is desirable, but also school *consultations* with nurse or physician, when the parent has neglected treatment for the child, for instance. A notice such as the following may be sent, at the end of the three-day period mentioned:

DEPARTMENT OF MEDICAL SUPERVISION OF SCHOOLS

Date....., 19...

To the parent or guardian of.....
Public School.....

You were notified a few days ago that this child was found on examination by the school physician nurse to be in need of immediate treatment for.....

Please call at the school at.....o'clock.....
to confer with the school physician nurse.

.....
Principal.

Cross out either "physician" or "nurse" where they are printed for alternative use. This card may be white in color and 3¼ by 5½ inches in size. Other devices to obtain treatment will be invented by the thoughtful and interested nurse, physician, or principal. Some cities use attendance officers to force children in whom the doctor or nurse will not admit till treated or cured. Notice is also sometimes sent that parents are keeping children out *illegally*, even though excluded or referred for treatment.

When the time has come, three days after notification, and the pupil is in school, the teacher sends the pupil in for the nurse's or physician's inspection to see if the cure has been obtained. No record of cure or treatment is ever to be made without such inspection. The teacher's opinion is not enough. Doctor Foster, of Oakland, California, has his nurses record cures at the first routine inspection only, and these for ailments found the year previous. *Cures* take time.

A further attempt at accuracy, co-operation, and a check on the work of doctor and nurse, is the principal's monthly report based upon his own and the teachers' records. This may be made very briefly as a part of the monthly report. The following tentative standard classification and terminology with probable frequency of ailments should be used for weekly and annual reports.

School Ailments and Defects with Probable Number of Ailments to be Found Among a Thousand Elementary Pupils

I. NON-COMMUNICABLE AILMENTS

A. Physical Defects.	
1. Adenoids, nasal obstruction, etc.	50
2. Anemia	10
3. Deafness, defective hearing	5
4. Dental, teeth defects	660
5. Enlarged tonsils	60
6. Eyesight, vision defects	70
7. Eyes crossed, strabismus, squint	7
8. Glands enlarged, adenitis	10
9. Heart defects	9
10. Lungs very weak, not tubercular	5
11. Malnutrition, debility, indigestion, "general condition"	20
12. Mentality	10
13. Nervousness, chorea, habit spasm, nervous exhaustion	2
14. Palate defects	7
15. Skeleton, orthopedic defects (flat-foot, club-foot, etc.)	2
16. Spine: curvature, posture, round shoulders, etc.	8
17. Speech: stuttering, stammering, lisping, etc.	9
B. Common Ailments.	
18. Abscess, boils, etc.	5
19. Acute sore throat, cough, etc.	2
20. Bronchitis	1
21. Cleanliness needed	20
22. Catarrh, rhinitis	10
23. Colds, bad. Coryza	30
24. Ear discharge, otitis media	15
25. Ears: earwax (impacted cerumen), foreign bodies, etc., minor	5

26. Eczema	7
27. Eyes: "sore," blepharitis, sties, iritis, etc., minor	20
28. Headache (a symptom), migraine, neuralgia	15
29. Laryngitis	5
30. Nosebleed, epistaxis	2
31. Pharyngitis, chronic sore throat	3
32. Rheumatism	1
33. Sex ailments and habits	10
34. Skin ailments, minor; herpes, seborrhœa, acne (blackheads), etc	15
35. Stomatitis, mouth ulcers, "canker sores"	1
36. Wounds, sores, sprains, poison-ivy, chilblains, "first-aid," etc	150
37. Urinary ailments, incontinence of urine, eneuresis	2

II. COMMUNICABLE AILMENTS

A. Parasitic and Minor Infectious Ailments.

38. Conjunctivitis, "pink eye," etc	30
39. Favus, yellow scalp sores	1
40. Impetigo "contagioso," infectious sores	20
41. Influenza, grippe, infectious colds of a serious character	1
42. Pediculosis, head lice and vermin	50
43. Ringworm, body and scalp	4
44. Scabies, itch	5
45. Tonsilitis, quinsy	10

B. Infectious Diseases.

46. Chicken-pox	6
47. Diphtheria	2
48. Measles	4
49. Mumps	4
50. Scarlet fever	4
51. Trachoma, "granulated eyelids"	1
52. Tuberculosis of the lungs, "consumption"	1
53. Tuberculosis of the bones and other parts of the body	1
54. Whooping-cough, pertussis	2
Total	1,409

(*D*) *Treatment, Cure, and Correction.*—First-class school clinics, as free to the children as text-books but carefully regulated by the school officials, are sure to be made a part of

all school systems, first in the poorer parts of the larger cities, but later everywhere. This is the cheapest and best means the community can take to develop real preventive medicine, for the small amount of clinic treatment in the child's school period, and before, will mean the early detection and eradication of many grave pathological beginnings. A permanent tooth lost, for example, can never be replaced. It is gone forever; and no less an ideal than the saving of nearly all teeth up to the age of twenty and beyond can be long tolerated.

But such thoroughgoing clinics will be long in coming, as shown in the chapter on that subject, and many substitute measures must be employed. Parents and family physicians must always be given the first chance for most ailments, even when their work is poor. Dental work may be accomplished by the use of a travelling chair sent from school to school and manned by voluntary or paid dentists. It is comparatively easy to get individuals or private organizations to give much valuable service in this direction. The splendid work being done abroad can be learned in Doctor Cruickshank's volume on "School Clinics at Home and Abroad." No book has yet been written on the work being done in this country.

(*E*) *Prevention.*—All the work of medical supervision is preventive from the life standpoint, but the emphasis should be strong on this phase as in no other phase of human effort. The medical supervisor must interest himself in the physical-education department, not only for medical gymnastics and training of mouth-breathers, but for building up general bodily resistance and vigor. The consultation hours for mothers, now becoming common in schools, will help to get prevention at work very early with the little children yet infants. Co-operation with all agencies will centre the best efforts of the community on adequate health protection.

Superintendent's Annual Report on Medical Inspection.—Much in the way of progress, records, and education of the public depends upon the character of this annual, public re-

port. The number of pages of the present reports devoted to this subject varies greatly even by percentages. South Manchester, Connecticut, probably gives a larger share of its report to these newer health matters than any other city. The plan of coming around to health matters every few years for intensive and comparative treatment, while emphasizing certain general features every year, is to be commended. Some of the features of the regular report may well be:

(1) The summary of the weekly reports, which have been summarized for the newspapers and for each monthly board meeting during the year, both as to ailments and the general features given on both sides of the weekly report.

(2) Comparison with the work of former years.

(3) Interpretation of the data presented.

(4) Some of the interesting cases handled during the year, to give the intimate personal side, with photographs, if possible.

(5) Emphasis on the percentage of ailments *cured.*

(6) The principal needs and problems, and what parents can do to help.

(7) Appreciative words for the various voluntary health agencies that have helped during the year, the newspapers, bequests for school clinics, etc. How the various divisions of the hygiene department have co-operated.

(8) A general estimate of the health conditions of the school-children.

Measuring the Efficiency of Medical Supervision Systems.—The principal efficiency tests are the percentage of the serious ailments existing in the school population that have been *found* and the percentage of the ailments found that have been *cured.* The decrease in ailments found from year to year due to prevention and curative measures (not to changes in the standards of inspectors) is a third essential factor. The estimate given above of the approximate percentages of serious ailments to be found in an ordinary school population at the present time, may be used for comparison.

Among a host of other tests of efficiency of this work are the following:

(1) Number of physicians and nurses in proportion to the school population, and the number of nurses in relation to the number of physicians.

(2) The qualifications and the character of the supervision of these officials.

(3) The percentage of the school population inspected and examined, and the frequency of these.

(4) The quality of the reporting system, whether it emphasizes essentials, and whether it promotes accurate records with minimum loss of time from other work.

(5) The annual number of hours of work for physicians and nurses, and the regularity and punctuality of attendance upon such work.

(6) The reasonable freedom from epidemics, closing of schools, deaths of school-children, amount of exclusion, quarantine, illness, absence and elimination, etc.

(7) The quality of the methods of doctors and nurses, to be determined by expert observation.

(8) The amount of *State-aid* money obtained because of efficiency demonstrated to the State Supervisor of Hygiene.

NOTE.—Complete explanation of this plan of health supervision may be found in the editor's volume entitled, "The Administration of School Medical Inspection," published by Teachers College, Columbia University, New York City.

CHAPTER XII

THE SCHOOL NURSE AND HER WORK[1]

The Introduction of Nurses.—It was the introduction of the trained nurse to the work of school medical inspection that revolutionized the health supervision of school-children.

In England, in 1893, we have the first definite record of the work of the school nurse. This work was done voluntarily by Miss Amy Hughes, a member of the Metropolitan Association of Nursing, who was asked by one of the managers of a poor school in the Drury Lane district in London to visit the school and attend to the children's small ailments. The result was most beneficial. In 1898 a voluntary association was formed, called the London School Nurses' Society. The following circular was prepared and issued by it:

> The London School Nurses' Society has been formed with the object of supplying visiting nursing to elementary schools in poor districts. Already three nurses visit some of the poorest schools and attend to the small ills of the scholars—such as sore heels and inflamed eyes.
>
> Excellent results follow their ministrations: each is able to visit four schools in one day, and see about one hundred children, who are sent to her one by one by the teachers. It is hoped that the work of the London School Nurses' Society may be done wherever possible by a Queen's nurse, and so avoid the multiplying of agencies. The Jubilee Institute has approved of school nurses in principle. Probably it will be difficult to impress on the public the importance of the work to be done, or the necessity for these nurses; but it must be remembered that the sore heel soon becomes poisoned if left to London dirt, and the inflamed eyes often lose all power of seeing simply through neglect. There is no surer way of securing the health of the people than to arrest small ills at the beginning; a nurse can see at a glance

[1] See also the chapter on "The Professional Training of School-Health Workers."

whether a child should be sent to a doctor; she can impress cleanliness; she can follow up bad cases to their homes; she can recognize the early symptoms of fevers, and do much to stop the spread of those infectious diseases which so often devastate our schools. It is found that cases of bad eyes and dirty heads are practically stamped out of a school by six months' regular visiting; consequently each nurse is able to enlarge the scope of her work as time goes on.

In 1904 the London county council took over the work, thus placing it under municipal control. But it was in 1902 that school nursing was first put on a municipal basis, and New York City claims the credit for this forward step.

New York City History.—Medical inspection of schools had been established for many decades before this, but the results were far from satisfactory. The history of school nurses in New York City is particularly interesting, inasmuch as those who suggested and helped to work out the scheme of school nursing are still actively engaged.

The suggestion came from Miss Lillian D. Wald, who was talking over the health problem of the schools with Doctor Lederle, Health Commissioner of New York City, and Mr. Charles Burlingham, chairman of the Board of Education. The question under discussion was: "What is to be done with all the children who are excluded from school for minor contagious diseases by the medical inspectors?" Miss Wald at once said: "Try a nurse." She herself is a nurse and always sees the great possibilities in new opportunities; so, after some further discussion, it was decided to see what a nurse could do for the children in the schools, and for the return of those who were excluded. The writer was asked to make the experiment, and on September 1, 1902, began by selecting for test purposes four of the large down-town schools.[1]

First Duties.—The first duty was to visit the school principals and explain the work. As no rooms were available, any corner of the schools which could be utilized was selected.

[1] Thus the writer of the chapter has the honor of being the first municipal school nurse.—ED.

Arrangements were made to have all children examined by the medical inspector sent to the nurse, who treated the minor cases in the school; the remainder were taken to dispensaries, except those who were excluded for the major contagious diseases, such as scarlet fever, measles, etc. A list of the children excluded was obtained from the principal, and these were looked up and returned to school as soon as possible. An hour daily was spent in each of the four schools, and a regular time-table followed. The supplies used were generously donated by the Nurses' Settlement. A course of treatment was outlined and submitted to the Department of Health, which with a few revisions is in use at the present time. This course of treatment is about as follows:

Treatment.

Pediculosis.—Saturate head and hair with equal parts of kerosene and sweet oil; next day wash with a solution of potassium carbonate (one teaspoonful to one quart of water), followed by soap and water. To remove "nits" saturate hair with hot vinegar.

Favus, Ringworm of Scalp.—Mild cases: Scrub with tincture of green soap, cover with flexible collodion. Severe cases: Scrub with tincture of green soap, epilate, paint with tincture of iodine, and cover with flexible collodion.

Ringworm of Face and Body.—Wash with tincture of green soap and cover with flexible collodion.

Scabies.—Scrub with tincture of green soap, apply sulphur ointment.

Impetigo.—Remove crusts with tincture of green soap, apply white precipitate ointment (*ung. ammon. hydrarg.*).

Molluscum Contagiosum.—Express contents, apply tincture of iodine on cotton toothpick probe.

Conjunctivitis.—Irrigate with solution of boric acid.

Supplies.—Later the Board of Education provided the following supplies:

1 screen.
2 chairs (1 high).
1 cabinet.
1 table.

1 scrap-basket.
12 towels.
2 pounds absorbent gauze.
1 dozen bandages (assorted sizes).
1 pound boracic-acid powder.
1 quart tincture of green soap.
4 ounces collodion.
1 pound vaseline.
4 ounces white-precipitate ointment.
2 basins (white granite).
1 glass jar (1 gallon).
1 ointment jar (glass).
100 bichloride-mercury tablets (to be kept in safe place).

These were ordered by the principals with the other regular school supplies and replenished when necessary.

Municipal Appointment.—On November 7, 1902, the Board of Health appointed its first school nurse, Miss Lina L. Rogers, R.N. In December of the same year twelve nurses were appointed, and their work for one month proved of such value to the community that the Board of Estimate appropriated $30,000 for school nurses for the year 1903. This is the beginning of what has developed into one of the most efficient social service organizations of the present day—three hundred and sixty-five school nurses being now employed by the Board of Health of New York City.

Growth of Nurses' Work.—In the beginning of the work the nurses' duties were limited to treating the children excluded by the medical inspector and to making home calls to explain what treatment was required for the excluded child.

Later on classroom inspections were added to the nurses' duties, giving the medical inspectors more time for the physical examinations. The opportunities for far-reaching social service became evident on the first visits to the homes.

Classroom Inspection.—In making the classroom inspection the nurse took her position by a window so that she might have a good light for the inspection of the child. The eyes, ears, nose, throat, skin, and hair were all examined for

evidences of disease or defect. Wooden tongue depressors were used for examining the throat, one for each child, and where any symptom of diphtheria was found the child was sent home. Where any defect was present the children were referred to the medical inspector. His duty was to make a diagnosis. A code was devised by which numbers could be used instead of the name of the disease, to conceal from children the name of the disease, and to lessen the clerical work.

Code Used.

CODE[1]

1. Diphtheria.
2. Pediculosis.
3. Tonsilitis.
4. Pediculosis.
5. Ac. conjunctivitis.
6. Pediculosis.
7. Trachoma.
8. Pediculosis.
9. Zero.
10. Scarlet fever.
11. Measles.
12. Varicella.
13. Pertussis.
14. Mumps.
15. Zero.
16. Scabies.
17. Ringworm.
18. Impetigo.
19. Favus.
20. Molluscum contagiosum.
21. Acute coryza.

Zero numbers are given to children having no disease, so that all should be given a code number. No feelings were hurt by the method.

Home Visits.—The nurse took charge of the child after the diagnosis, and by persistent effort and many visits to the home, finally persuaded the parents to have the defect remedied or disease treated. It is this following up and pointing out the danger of neglect that means so much to the child and to the success of school medical inspection. The whole aspect of the school medical work has changed since nurses have taken such a prominent part in it. *It is no longer medical inspection of schools. It is medical or health supervision of school-children.* The child has a future, and some one must in dead earnest point it out to the parents who fail or refuse to see it.

[1] See also code in preceding chapter, prepared by the editor.

School Boards' Duty.—Right here it may be said that some boards of education are not doing their full duty toward the children under their charge, by forcing them to study while they are physically unfit. Where now employed, the school nurse's duties are numerous and varied. Besides making the classroom inspections and referring the cases to the medical inspector she is called upon to do much of the scientific work. In some cities the school nurse takes the swabs for throat cultures, and excludes all suspect cases of diphtheria, scarlet fever, measles, etc., as soon as discovered, notifying the medical inspector of such exclusion as well as the health department. She is also permitted to treat eye diseases in school according to the physician's order.

Drills.—She is responsible for the conditions of cleanliness of the mouths of the school-children as well as their general cleanliness. Tooth-brush drills are carried on regularly and efficiently in the schools by the nurse. Nose-blowing drills are no longer a fad but a recognized necessary aid to general health habits, and the nurse is the one who sees that this is regularly carried out. It was a nurse who originated these drills in the schools.[1] Even now we are learning that this has a very marked effect on the breathing of the children, inculcates cleanly habits, and keeps the air in the classroom purer. Teachers are beginning to see the valuable effect of it on their own health.

In the visits to the homes even greater good is being done by the school nurse. Here she imparts instruction on the care of the body, the value of clean surroundings, of wholesome food, of proper clothing, and of right habits of living. She discovers all kinds of unhealthful conditions, concealed cases of contagious disease, rooms without air or light, overcrowded homes where bad moral conditions exist, filthy drains, and leaky plumbing. These and other conditions are being constantly reported by the school nurse to the proper authorities, and adequate relief obtained from the proper sources.

[1] The writer herself.—Ed.

Rural School Nursing.—In rural communities health supervision of school-children is quite as important as in the cities. It is not possible for many of the smaller municipalities to provide a medical inspector, nor is it always necessary. If a properly qualified nurse is employed she can urge the parents to consult their own family physicians, and in this way have almost all defects removed or diseases cured. It will not be necessary for one school to have a nurse devote her whole time to it. Several districts could unite and have the nurse spend one day a week in each. This would divide expenses and give a good service. Each school should be visited frequently to note progress, to urge the practise of hygienic measures advised, such as the drills, and to give talks on proper food, ventilation, dental care, etc.

Relief Organizations.—One of the school nurse's duties will be to find out all the relief agencies in her district or districts. If there is no dispensary, she will be the one to find ways and means to establish one. If the authorities cannot aid, some influential women in the neighborhood should be induced to unite and have it started. If relief is required, similar means are taken to secure it. Everything, of course, should be done so far as possible by the municipal authorities.

I believe that the school board should furnish freely everything that is necessary for the child's health and strength, such as food, clothes, and medical attention, wherever it cannot be furnished by the home. Otherwise it is waste of money to try to educate the child. A weakened brain cannot be active and receptive; therefore strengthen it so that it can. Children who are anemic and undersized should be kept in the open. The school nurse should urge that children be taught in the open all day in country schools as well as the city, and what is good for the delicate in this instance is equally good for the strong. Let us have no walls for schools when it is possible to do without.

Little Mothers' Classes.—The school nurse also should start little mothers' classes in the school as soon as she begins

work. Inestimable good will be done by having these girls taught how to do the essentials of home-making. Gradually they grow into the habit of wanting to know the reasons for this and that, and before long the nurse finds she is a teacher in sex hygiene in the most natural way. Teach the girls to bring their baby sisters and brothers, so that they may learn how to bathe them and note any abnormalities; show them how to make a bed properly; to prepare food for the baby; to make clothes for it; and to look for any unusual conditions in the children of the families who are their friends.

School Dental Chairs.—Here is the beginning of a great work in the development of the future race, in looking after the teeth. The "little mothers" will soon learn to look for the first tooth, and to keep it clean. If this interest is aroused and right habits formed we shall not need to fear for the future of the children's teeth.

It is very necessary that all the school-children have regular, systematic dental care. To this end, wherever possible, have a dental chair placed in the school. Experience has proved that the installation of dental chairs in the schools is not a difficult undertaking and is money saved many times over.

In Toronto, Canada, the school nurses subscribed $500 and presented it to the Board of Education for the equipment of a dental room in one of its schools. In addition the Board installed three chairs in other schools. This year six more schools have been equipped with dental chairs. A dental surgeon works from nine to twelve daily, and on Saturday from nine to eleven. Many methods may be used to get the money and permission for the first experiments.[1]

The Qualifications of a School Nurse.—The nurse who would be a successful school nurse must have a special training for the work. In addition to the general training in a hospital which has wards set apart for eye, ear, nose, throat, and skin diseases, she should have a course in district nursing.

[1] See chapters on co-operation and initiation of school-health measures.

This is most important, as it brings the nurse in contact with home conditions. Here she learns how it is sometimes next to impossible for the parents to get things done, owing to all sorts of unfortunate conditions.

A capable, intelligent nurse who knows the agencies in her district can often relieve serious situations at once by a few helpful suggestions as to how relief may be obtained. The school nurse should have a healthy, pleasant appearance. The nurse who fails to keep herself tidy and neat, and whose teeth are not in good condition, does not gain the confidence of the children, and her work is never successful.

The school nurse should have a broad social outlook. She must be a *power* in the community in which she works. She must know how to meet rich and poor alike, and this is where *tact*, good sense, and sound judgment are required. She must know how to avoid hurting the feelings of the family physician.

The most essential requirement is thoroughness. Every detail should be recorded for future use—some may be mental notes. One nurse reported ninety-nine visits to one family before she got results.[1]

Controlling Authority.—The school nurse should be employed by the board of education or board of school trustees as one of the regular school staff. This avoids two authorities controlling the school work. The teachers give heartier cooperation to one of their own associates, and all are working ultimately for the same result—to make the school-child a better citizen both physically and mentally. This has been clearly demonstrated since the school nurses became a part of the medical-inspection system.

Rules and Regulations.—In one of the larger cities the following general rules and duties of nurses have been adopted:

[1] Here is where legal compulsion can frequently be used to advantage.—Ed.

GENERAL RULES

As teachers, nurses, and medical and dental inspectors are all employed by the board of education, and as all are working for the fullest development of the children, educationally and physically, it should not be necessary to ask for hearty and harmonious co-operation in the work.

Always be courteous and sympathetic with parents and children, and thus avoid much needless resentment.

Absolutely no suggestions as to treatment shall be given except as hereinafter directed.

Medical inspectors and nurses must promptly report all discovered cases of contagious disease to the board of health, thus rendering efficient assistance in eliminating this menace to the community.

The following diseases must be referred to the principals for exclusion: smallpox, scarlet fever, diphtheria, measles, German measles, mumps, chicken-pox, acute tonsilitis, whooping-cough, open cases of tuberculosis, and such diseases of skin, scalp, and eye as, in the judgment of the medical inspector, should be excluded.

Except in case of sudden illness, request for leave of absence must be forwarded to the department of medical inspection at least one week before such leave is required. In case of inability to report for duty on account of illness, notify the department of medical inspection by telephone.

A written notification must follow within twenty-four hours. When reporting for duty after absence, a certificate of illness from the attending physician must be presented.

Daily reports must be forwarded in time to reach the department of medical inspection by the first mail on the following morning.

At each school visited, a time-book must be signed, stating the time of arrival and departure. All cases requiring treatment must be referred by card, in sealed envelope, to the family physician. Medical inspectors and nurses must not remove the clothing for examination of children, "without consent" or in the presence of parent or guardian. Medical inspectors and nurses must not interfere in any way with the school discipline.

Duties of Nurses

Each nurse is assigned to a group of schools.

The hours of duty are from 9 A. M. to 4 P. M., and Saturday, 9 A. M. to 12 noon.

Each nurse shall prepare a time schedule for her group of schools

which must be forwarded to the superintendent of nurses for approval; a copy must be given to each principal.

Each nurse must see cases referred to her by the medical inspector and deal with them as directed.

Morning Inspections and Treatments.—In a room designated for the purpose the nurse must receive each morning all children referred to her by the medical inspector, and give instructions or treatment as follows:

Pediculosis.—Children affected with pediculosis are to be instructed as to methods of home treatment. Each child must be given a copy of the official circular, entitled "Instructions to Parents on the Care of Children's Hair and Scalp." These children are to be instructed to report to the nurse at her request, and at such times are to be examined for evidence of treatment. In instances of persistent neglect, the child is to be referred to the medical inspector for exclusion.

Eye and Skin Diseases.—Methods of treatment to be employed.

Favus.—Mild cases: scrub with tincture of green soap and cover with flexible collodion. Severe cases: scrub with tincture of green soap, paint with tincture of iodine, and cover with flexible collodion.

Ringworm of Scalp.—Treatment as in favus.

Ringworm of Face and Body.—Wash with tincture of green soap and cover with flexible collodion.

Scabies.—Wash with tincture of green soap, and apply sulphur ointment.

Impetigo.—Remove crusts with tincture of green soap, and apply white-precipitate ointment (ammon. hydrarg.), 10 per cent.

Conjunctivitis.—Irrigate with warm solution of boric acid.

Instructions for Physical Defects.—The nurse must obtain each day from the medical inspector a record of the physical defects of each case examined on that day. When necessary the nurse may request the parents to confer with her at the school regarding the treatment for the child.

The dates of these consultations must be noted on the nurse's record copy. The nurse will note on the physical-record card the nature of the treatment received from the family physician.

Emergency Cases.—In the absence of the medical inspector the nurse will give first-aid treatment, referring all such cases as require it to the family physician. In the absence of the medical inspector any suspected case of major contagious disease should be referred to the principal for exclusion, and should be reported immediately by telephone to the department of medical inspection, giving child's name and address. A written report must be mailed the same day.

The nurse must be ready to give any information to the principal

as to the children under her care. A child must not be sent from school without the consent of the principal.

Routine Inspection.—The nurse must make a fortnightly routine inspection of the children in the classrooms. The eyelids, throat, skin, and hair of each pupil are to be examined.

The children are to be instructed to pull down the eyelids, open the mouth, and show the hands. Wooden tongue depressors are furnished by the department, and a separate one must be used for each child where such use is necessary. *No tongue depressor is to be used more than once under any circumstances.*

All cases of suspected minor contagious disease found are to be noted on the class record cards, with the data, in appropriate columns.

The class record cards must be kept in an accessible place in each school in charge of the nurse. Code numbers or letters must be used to indicate the disease.

All suspected cases of contagious eye and skin disease found are to be referred to the medical inspector for diagnosis.

Home Visits.—When cases referred by the medical inspector have not been given treatment in a reasonable time, the nurse must visit the parents at home to explain the condition and the necessity for treatment. The nurse must give general directions regarding proper food, ventilations, cleanliness, and general hygiene. Revisits must be made in each instance until evidence of treatment is shown, or parents refuse treatment. No case must be terminated on account of inability to obtain treatment until it has been referred to the medical inspector.

If the parents are unable to take the child to a dispensary, the nurse may do so, but must previously obtain in writing a request to that effect, signed by the parent or guardian.

No visit shall be made to contagious cases.

Home visits and visits to hospital or dispensary must be noted on the nurse's record copy. The form must then be submitted to the medical inspector, who will sign it if the evidence is satisfactory.

Evidence that a child is under medical care is sufficient for terminating the case.

Meetings.—Nurses must report regularly, in person, at such times as may be designated, to the superintendent of nurses.

In Conclusion.—The possibilities of the work of the school nurse and the opportunities afforded her of doing real constructive work, both in the schools and in the homes, cannot be estimated. The bond of friendship which exists between

the school nurse and the mother in the home makes it possible to secure for the children from infancy onward a far greater degree of care than would, or could, otherwise be given. The school nurse has it in her power not only to remedy the existing conditions which are menaces to right living but has also the opportunity to open up new avenues of social service. Her work is not alone with those who have defects or disease but very largely with those who are well. Her duty will become more and more the supervision of the life habits of the well; therefore much more teaching of the laws of health will be observed and the result to humanity can better be imagined than described. Nurses have a splendid opportunity for fitting themselves for this new field in nursing by taking a course at Teachers College, Columbia University, where the practical training is also provided.

CHAPTER XIII

SCHOOL FEEDING

School Feeding as an American Problem.—The school lunch has always been an important part of our American school life. The noon hour plays a prominent part in stories of the little old red schoolhouse of former days. It was then that the pent-up energy of social longings found relief, and the most enduring companionships were formed. Almost all of the young people stayed at the school during the noon hour and ate lunch together because few of them lived near enough to go home. This condition still prevails in rural districts, but where urbanization has taken place schools and homes have been brought nearer together in distance and the school lunch has largely disappeared.

But there is one kind of school—the high school—in which the old order has never changed. This is because in towns and smaller cities there is usually but one high school, and even in larger cities each school serves a large district. The consequence is that the children have a long way to go to reach their homes, and so we have developed the single session extending over the noon hour and broken by a short lunch period. As a result, in hundreds of high schools throughout the land, groups of young people numbering from a score to many thousands in each locality are every day confronted by the alternatives of going hungry, eating a lunch brought from home, or buying one near or in the school.

How the High School Meets the Problem.—The many ways in which the high schools meet or fail to meet the problem may be summarized under the two headings of no provision and supervised provision, either indirect or direct.

The first method is rapidly becoming less common. Under it the school authorities pay little attention to what the young people eat during the lunch period, or where they eat it, so long as they do not annoy the teachers or litter the premises. The results are socially unwholesome and physiologically unhealthy. The breaking of bread with one's fellows is an important social matter and the conditions surrounding it should be as comfortable and cheerful as circumstances permit.

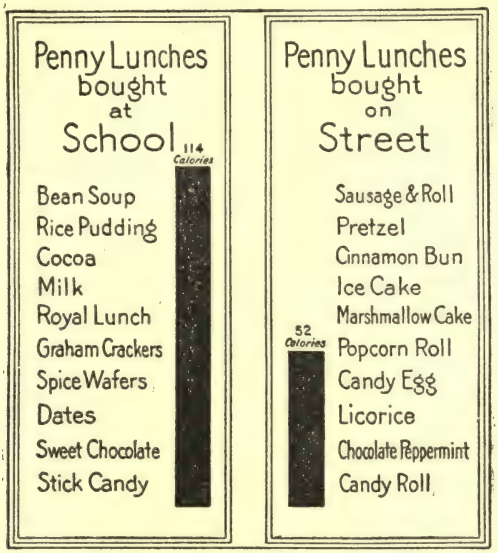
The health considerations are more important. Where no place is provided in which the boys and girls can eat their lunches conveniently and in leisure, there is every temptation for them to eat nothing at all, or to eat little and bolt that little down with the greatest possible speed.

These conditions are frequently but slightly bettered when the school authorities sell to the janitor or some caterer the privilege of maintaining a lunch-room in the school building without official supervision or control.

The second form of solution came into being when Boston, in 1894, determined to grapple with the high-school lunch problem and solve it. In that year Mrs. Ellen H. Richards was instrumental in getting the school board to decide that all selling and serving of food in its high schools must be done with its approval and under its supervision. An arrangement was made with the New England Kitchen through which wholesome lunches were prepared and distributed to the city high schools. This plan was successful, and has been developed until at present the fifteen public high schools of Boston are daily supplied with lunches prepared by the New England Kitchen and sold to the students at cost. The rooms and equipment are furnished by the city and a committee of high-school masters supervises the work. At present the school board is considering taking over the lunch-rooms for direct control.

An example of the *direct* provision of high-school lunches is furnished by Philadelphia, where the work in every school

is financed and controlled by the board of education. The superintendent of this lunch system has the rank of supervisor in the school government. She is an expert dietitian.



RELATIVE FOOD VALUE OF SCHOOL AND STREET LUNCHES

The left-hand column represents the food value of a penny portion bought at school when a charge of one-quarter of a cent is made for service. The right-hand column shows the food value of the amount purchased for a cent from the street vendor, who makes all he can on the deal.

At school the amount of food given for one cent is always as high as possible. In the street the child can buy something which is not food at all, like licorice.

In addition to supervising the preparation of the lunches, she spends several hours daily teaching classes about food uses and values. In this teaching the school lunches are used as examples of economical, carefully planned, and wholesome meals. One of the lessons is that the typical lunch at school, costing ten cents, gives seven hundred calories, while crullers and coffee, a common meal where lunches are

unsupervised, yields but two hundred and fifty calories for the same price.

Another example of municipal high-school lunches is afforded by Rochester. Since 1903 the two high schools of that city have conducted lunch-rooms directly managed by the board of education. The kitchens and dining-rooms, instead of being adapted basements, were provided for in the original plans of the buildings, and as much attention was given to their construction and location as was devoted to any of the other rooms.

The dining-rooms are light and airy, open to the direct rays of the sun, and have a seating capacity of one thousand pupils each. The kitchens are well equipped with such mechanical contrivances as steam cookers, dish-washers, and potato-peelers. The cooking is done by utilizing the *waste steam from the general heating plant*, so that there is no extra expense for fuel. An experienced dietitian, appointed by the board of education, superintends the entire work of purchasing, preparing, and selling the food. There are five workers in each school who cook and serve the meals.

These lunch-rooms are entirely self-supporting. As lessons of experience have made the work more efficient, the increasing profits have been devoted to providing more food for every five-cent piece paid by students, instead of turning the extra revenue back into the city treasury. The result is that each year has seen an increase in the amount of food purchased for five cents, until at the present time this sum secures for the children generous portions of well-cooked roast beef or roast lamb.

Other articles of food are correspondingly cheap. Soups cost five cents, desserts five cents, a large plate of macaroni with cheese and bread five cents, half a pint of certified milk three cents, a buttered roll one cent, and a bread-and-butter sandwich one cent.

The money received from the sale of food at these prices covers not only the entire cost of the food itself but that of

all the salaries of attendants and supervisors, besides the upkeep of equipment.

The work done in Rochester and Philadelphia is perhaps more highly developed than is general elsewhere, but nevertheless it is only a sample of what many cities are doing.

Administration of High-School Lunches.—The New York School Lunch Committee in a recent inquiry found that of 68 cities, 38 furnished students of the high schools with lunches directly; 18 had farmed out concessions to commercial caterers; 7 allowed co-operative student organizations to furnish lunches under supervision of the board of education; and in 5 cities lunches were sold by private philanthropic organizations, such as women's clubs, etc. In practically all cases the cities supported the lunches to the extent of the overhead charges. There is no doubt that high-school lunches are to-day practically recognized as a legitimate part of public-school provisions.

The general features of administration in sixteen typical cities are shown in the following summary based on data gathered by the Committee on High School Lunches in Boston in 1913. The cities included are: Brooklyn, New York, Buffalo, Rochester, Springfield, Fairhaven, Newtonville, Philadelphia, Pittsburgh, Cincinnati, St. Louis, Kansas City, Grand Rapids, Minneapolis, Omaha, and Seattle.

In all these cities the financial risk is finally lodged with the school board. Immediate responsibility for administrative detail rests with the domestic-science department in eight cities. In five cities the work is controlled by a special committee of the board. In two cities, where only one high school has the lunch, the work is directed by members of the faculty; and in the remaining city by the High School Students' Association.

In a number of cities they had first tried out the experiment of having janitors or caterers serve the lunches, but in four cities where the work is relatively new it was begun immediately under school-board control. In St. Louis and three

other cities the school-luncheon work is under the supervision of the domestic-science department, and cooking classes occasionally provide food for the lunch-room. This works out particularly well in the smaller cities where the numbers are not so large—as, for example, in Newtonville, Mass. In at least one case the money is handled by the commercial department of the high school. In Philadelphia the superintendent of lunches gives talks at the different high schools on lunches and dietetic principles involved.

There has been practically no attempt to connect the work in the high schools with the health department, though this connection is an important feature of the lunches in elementary schools. In Pittsburgh this was proposed and approved by the board, but had not been put in operation according to the last report. In only one city was the director reported as not specially trained for the work. In thirteen cities the superintendent of lunches ranks as a regular school officer, being either supervisor or a member of the faculty.

In nearly all the cities the surplus is designed for improving the lunches themselves, as, for example, reducing the price of foods served or buying new equipment. In a few cities, however, the money is returned to the general school fund, and in Springfield it is turned in to a common revenue fund for the city.

It is practically a universal custom to charge enough for the lunches to cover food and service. In a majority of cases enough is charged to cover the cost of ice, the upkeep of equipment, and repairs. The cost of superintendence is covered in eight cases, and fuel in five. Light, heat, rent, and water-rates are not included in the cost.

The School-Lunch Problem in Elementary Schools.—The essential features of the planned and supervised lunch in the best high schools are that the child's need is provided for, the food is sold at cost, and it is wholesome and well served. The lunch-rooms are cheerful, pleasant, and sanitary, and the work

is under responsible management. Moreover, there is no compulsion, actual or implied, put on any child to buy the school lunch—he is simply given the opportunity.

The question that school workers are now asking is: Why cannot the same benefits be secured for the vastly larger number of elementary-school children? In the smaller towns and country districts the younger children face the same noon problem as their older brothers, with the difference that they have a longer afternoon session of work ahead. In mill and factory towns and in the poorer districts of the large cities, even when the children go home at noon, there is frequently no one there to prepare lunch. Both father and mother are absent at their work. Moreover, ignorance about nutritive food and its preparation is so dense and so wide-spread that thousands of children start for school in the morning after a totally insufficient breakfast consisting, for instance, of coffee and bread, and taking with them a few pennies to buy lunches in the shops near the school. In consequence they must wait until night before they get a real meal.

The fact that more than fourscore cities are already taking steps to meet this problem shows that it is real, wide-spread, and serious in degree. The first question which confronts every one of these cities, as well as the others which have not yet begun to provide for school lunches in elementary schools, is whether or not this work is a legitimate function of the board of education.

Objections to School Feeding.—When the project of inaugurating school feeding in elementary schools is proposed to the taxpayer, the citizen, or the school man, the immediate reaction is almost always one of opposition. The expression of this opposition takes many forms, among which the following arguments are usually prominent. School feeding, it is claimed, would further complicate the already intricate systems of public education; it would add to the work of already overburdened teachers. The providing of school meals would tend to lessen the responsibility of the home and

so undermine the foundations of family life. If meals are provided at all, they tend to become not only free but universal, which would result in pauperizing the community. As some children would receive meals and others not, the system would tend to promote undesirable distinctions among the children. If children are genuinely underfed at home, the provision at school of one meal per day will not solve the problem of their proper nourishment.

The foregoing arguments are the most important of those commonly urged against school feeding and are fairly typical of the rest. On careful analysis, all of these arguments fall into two classes. In the first come those objections which form one or another feature of the general argument that the providing of food is not a legitimate function of a department of education. The objections of the second class include arguments that school feeding is socially dangerous. It seems worth while briefly to consider whether or not the objections against school feeding are so important and valid as permanently to exclude it from among the possible activities of the modern socialized school.

To the first objection, that furnishing food is not a legitimate function of a department of education, it may be answered that under our systems of compulsory education the power to force every child to attend school carries with it the duty of making it possible for every child to learn. If the child is so hungry that he cannot learn, some means must be provided whereby he shall be fed. Hunger is a stern condition, not a social theory. It cannot be met through the offering of a geography or a grammar. It is clear that where social conditions exist which involve the presence in school of large numbers of unfed or underfed children, it is the function of the school to see to it that some means be provided whereby these children can obtain food in order that they may be in condition to obtain knowledge. This does not necessarily involve provision by the school itself. It does involve the facing of the problem and the securing of some solution for it.

The arguments of the second class claim that school feeding is socially dangerous, that it tends to undermine the responsibility of the home, and that it results in governmental paternalism.

There is one nearly universal fallacy in the reasoning that lies behind these arguments. This is the assumption that any form of school feeding means the free provision of meals for all children. This assumption is unwarranted by the facts either here or abroad. Such work as that already described as being carried on in the high schools of Rochester, Boston, Philadelphia, and other great cities has no remote suggestion of the dispensation of alms. What it does provide is the opportunity to purchase wholesome food at cost. This is what school feeding in America has meant up to the present time and, so far as we can foresee, it is in the main what it will continue to mean. Moreover, it is in large measure what school feeding means abroad.

Elementary-School Feeding and Medical Inspection Analogous.—There is a close analogy between the extension of the school's activities to provide an opportunity for purchasing food, and the existing systems of medical inspection which examine children and notify the parents of the steps which need to be taken to put them in such physical condition that they can benefit by the free education provided by the State. Both are extensions of social machinery which provide opportunity for, but do not supply the remedy for, the wrong condition found. The sort of school feeding which we are discussing provides machinery for finding out which children need food, and for giving their parents an opportunity of remedying the situation by purchasing food at cost. In the same way, medical inspection examines the children and discovers existing defects, but does not remedy those defects. It simply gives the parents an opportunity of knowing of existing conditions and it points out the remedy. Public-school clinics and other forms of public treatment, of course, are rapidly entering the field of free treatment, but for the most part municipal clinics restrict free treatment to those in destitute circumstances.

In stating that the establishment of school feeding means the provision of opportunity to purchase wholesome food at cost, it would be misleading to overlook the fact that there will always be some children in the poorer sections of our great cities who are genuinely indigent and to whom meals must be furnished free, if they are to be furnished at all. There is nothing new about this situation, nor does it present any insurmountable difficulties. In every State and city where school text-books are purchased, there have been in force for many years different regulations for providing books free of cost to children unable to purchase them. The machinery for solving the same problem with respect to meals has been brought to a high state of perfection in several European countries, though little has been done to meet it here.

In America the school-lunch movement which has had an astonishing development in the last five years is characterized by the absence of the relief element. Although a large proportion of our school-children—10 per cent by conservative estimate, 25 per cent by more liberal interpretation—are suffering from malnutrition, the relief of this condition is not the primary aim of those advocating school meals. It is the conviction of American school men that, if the school is to assume responsibility, it must be because of educational considerations affecting 100 per cent of the children. This conviction was expressed again and again during the school feeding session at the Fourth International Congress on School Hygiene at Buffalo in August, 1913.

Administration of Lunches in Elementary Schools.—Within the last five years the movement for extending the benefit of warm lunches served at cost to the children in the elementary schools has spread from five to ninety cities in twenty-eight States. While in the larger number of instances the work has been inaugurated by private organizations, such as women's clubs, home and school associations, and so forth, it has been always with the moral support of the school authorities and personal co-operation of members of the school

governments, in addition to financial help in the way of overhead charges and fuel. As in the case of the high schools, there is a distinct tendency to regard the work of the private organizations as preliminary demonstration of methods feasible for use by the school boards when they assume entire responsibility. According to Edward F. Brown, executive secretary of the New York School Lunch Committee, out of sixty cities thirty-five were serving meals under the jurisdiction of the school board.

The essential features of the administration of the work in New York, which dates from 1908, are as follows: There is a committee of eighteen men and women, including school-board members, medical inspectors, social workers, and members of the faculty of Columbia University. The chairman is an experienced dietitian and social worker. The superintendent is a graduate dietitian with experience in teaching and dietetic social service in a hospital. The buying, and the engaging and direction of cooks and helpers, are in her hands. There are seventeen schools supplied with lunches at noon from four central kitchens. A year of experience with central kitchens has demonstrated their greater economy and efficiency as compared with separate kitchens. The only limit to centralization of kitchens is made by the necessity of providing different menus for schools with attendance of different nationalities. Thus, separate provision is made for Italian, Jewish, and Irish-American children. This is, however, distinctly a problem of very large cities.

The cooks are employed for the whole of each school day at a weekly wage of ten dollars. Under the superintendent are a corps of paid supervisors who are present two hours daily at each school to see to the preparation, selling, and distribution of food. The actual serving of the food is done by pupil monitors who wear white aprons, caps, and gloves. These helpers receive their lunches free.

Owing to the large numbers, and lack of special dining-room provision, the children eat their lunches standing at

long tables erected in the basement. Each child must purchase the main dish, a bowl of soup, before being allowed to get the penny extras served at a separate table. The kind of soup varies with the predominant nationality of the children. Examples of soups served in the *American* districts are: split pea, tripe, clam chowder, vegetable, Scotch broth, and macaroni. The food value varies from 74 to 148 calories. In the *Jewish* schools the food is heavier and, to avoid offending the laws of kosher, entirely without meat, as: potato and barley, lentils and rice, lima beans and barley, rice and milk, Obergritz and potatoes, noodles and milk. The average number of calories here is 190. In the *Italian* schools the special dishes are menestra, rice and tomato, beans and pasta, macaroni, and rice with cheese and tomato. The average number of calories is 138.

After the child has bought the soup he goes to the extra table, where he may purchase one or two other things at a penny apiece. Among the extras are: sandwiches with jam, egg, onion, lettuce, meat, bologna, and cheese; potato, cabbage, tomato, or lentil salad; bread, chocolate, or rice pudding; cocoa; sweet chocolate squares; crackers, jelly cake; ice-cream; grapes, bananas sliced with milk, prunes, apple sauce, baked apple, apple sugared on stick.

A child spending three cents at these tables gets from one-third to one-half of the total amount of food he needs during the day.

Feeding in Open-Air Classes.—In classes for tuberculous, anemic, and convalescent children the lunches are as much a part of the treatment as the fresh air itself. The meals are more elaborate than is usual in the regular schools, and they are more frequent. The following menu is typical of the American practise:

Breakfast: Cocoa, graham gems, butter, stewed prunes.

Lunch: Stew of rice and mutton, or creamed codfish, mashed potato, bread and butter, milk, dates or figs.

Supper: Milk, crackers and cream cheese, or preserved fruit.

These meals supplement the home meals. Counting in the average home meals, the children consume as much as 2,500 calories, which would be far too high for normal children but not for these whose metabolism is overactive or deranged.

Lunches in Rural Schools.—One reason that health conditions in rural schools have been so long neglected is because of the common idea that country children are naturally vigorous and healthy. "This ought to be so but unfortunately is not," says Doctor Ernest Hoag, in a recent government report. He finds that, "in general, food is not as well prepared in the country as it is in the city; the available variety is smaller." Bad methods of ventilation and heating at home and at school, exposure to wet in the long walks to school, and overdressing in the house—all are inroads on the already badly nourished bodies. Investigations show that malnutrition and its accompanying diseases are quite as frequent among country as among city children. Steps to remedy this condition are being taken in New Hampshire, Washington, Nebraska, South Dakota, Texas, and Minnesota; in the last two cases, under the direction of the State universities.[1]

The equipment necessary for the rural-school lunch need not be more elaborate than a top for the stove used for heating, some pots, cups and spoons, and wash-basin and towels. The preparation and service can be done by the children in turn, and is an excellent adjunct to domestic-science lessons. Frequently a single warm dish, like soup or stew, or cocoa, is prepared to supplement the cold lunches brought from home. The two essentials are warmth and the presence of protein, as the lunches brought by the children, as well as their home diet, are apt to be overrich in starches and sugars.[2]

The Place of Nutrition in the School Hygiene Movement.—In 1867 M. Dupré, Commissioner of Education in France,

[1] See report of Doctor Thos. D. Wood to National Education Association in February, 1915.

[2] See Andrew's "Education for the Home," part two, section two, bulletin 611 of the U. S. Bureau of Education.

recommended to the local directors that they look into the health of their pupils and pay particular attention to their nutritional condition. This is the first time that an official concern for the nutrition of school-children was recorded in any country, although it does not mark the beginning of school feeding. School funds for the support of extra-academic activities, such as lunches and baths, were made general throughout France as a result of M. Dupré's suggestion, and in 1882 the "Caisses des Ecoles" were made compulsory along with general primary education.

In 1872 a municipal law in Munich called for a kitchen and dining-room in all new school buildings. This was an official recognition of work which began as a relief measure in 1792. In 1890 the school feeding movement in Germany received national recognition at a congress of vacation colony workers, where it was decided that the good results of sending children to the country in summer were more than counterbalanced by the evils of bad feeding throughout the year. In 1909 the National Society for People's Welfare, in a three days' conference, reported on work in half the German cities and in many rural districts.

In England, between 1866 and 1905, largely through the efforts of teachers, no less than three hundred and sixty separate societies were organized for the relief of acute distress resulting from hunger. The agitation over "physical deterioration" in England, from 1902 to 1906, resulted in the discovery of malnutrition during the growing period as an important factor in the lowering of the national fitness. The first act of legislation to grow out of this agitation was the Provision of Meals Act, which gave the local educational authorities permission to install school restaurants as part of the regular school equipment.

Malnutrition and Medical Inspection.—Recently there has been an increasing tendency to make the report on nutrition of different children the basis of the entire medical-inspection report. This is because it has been demonstrated

again and again that the occurrence of disease and physical defects is largely conditioned by nutritional disturbances.

In Paris medical inspectors have charge of the school canteens and are required to report on the nutrition of each child. They are further expected to follow up any child with impaired nutrition and to administer tonics and special care.

In England, since 1907, compulsory medical inspection has included inspection of nutrition. Beginning with 1909, the chief medical officer of the National Board of Education has reported yearly on the nutrition of the children throughout the country and on the work of the school feeding centres. In Scotland the medical inspectors are required to see that children suffering from malnutrition are fed properly either by the school or by the parents. As a result of this systematic work British school doctors are developing methods of technique and standards for judging malnutrition, which, on account of its complex and interwoven causes, is very difficult to estimate accurately.

The correlation of disease and malnutrition is everywhere acknowledged. It has been worked out with scientific accuracy by Doctor Gastpar, of Stuttgart, who from 1906 to 1912 examined 65,000 children, making a thorough physical and medical examination, and then, dividing the children into five different nutritional groups, determined the proportion of disease and defects in each group.[1] Briefly, his results were as follows: If the children in the best-nourished group, who numbered 13,229, were compared with those of the worst-nourished group, who numbered 15,807, it was found that among 100 well-nourished children there were *36 defects*, whereas among 100 badly nourished children there were *185 defects*. The defects noted in this summary were: scoliosis, diseased glands, tuberculosis, heart-trouble, eye defects, ear

[1] For a preliminary report of this work see *Zeitschrift für Schulgesundheitspflege*, vol. 21, 1908, pp. 689–702. A detailed account of the entire investigation is in preparation by the author of the present paper.

defects, albuminuria, and anemia. As the badly nourished all had anemia, it would be perhaps fairer to call anemia part of the nutritional condition rather than a separate defect. In this case there would be *85 defects* to every 100 badly nourished, anemic children instead of *185 defects*.

The Classification of Nutrition.—Doctor Gastpar's method of classifying nutrition, which is known as the group method, is one of the most satisfactory yet devised for working use. It is briefly as follows:

(1) There is first an individual examination of each child, in which measurements of height and weight are taken, and the state of nutrition determined by these and other factors, such as the state of the superficial circulation, the musculature, skin tonicity, the condition of the mucous membrane, the expression of the eyes and the entire face, the roughness or smoothness of the hair, etc. At the same time other physical defects are noted that may bear upon nutrition, as the condition of the teeth, presence of adenoids, and particularly the presence or absence of anemia.

(2) After these records have been made for each individual child, the children are then divided according to their ages. Then the children of each group are divided into those having anemia and those without it. These two groups are further subdivided until, in order of nutritional excellence, children in each age-group stand thus: (*a*) good; (*b*) fair; (*c*) fair with anemia; (*d*) poor; (*e*) poor with anemia.

Experience in the application of this plan of classification has developed three general rules that are valid for application in any country. Briefly these rules are as follows:

(*a*) Every child is examined separately in a room specially provided, where the light and temperature may be regulated.

(*b*) One physician should make all the examinations for any given group of children.

(*c*) The examining physician should be familiar with the racial peculiarities of growth, complexion, and coloring.

This system involves time and care, but it insures a fair degree of accuracy in a subject not easy to define rigidly.

Some such scheme is absolutely necessary if experience is to be shared. This has been found specially valuable in record-keeping, and in finding the correlation between the state of nutrition and other physical conditions.

Extent of Malnutrition among School-Children.—Until the practise of measuring nutrition by some such standard as that outlined above becomes more general, the present discrepancies in reports as to the exact extent of malnutrition among school-children will continue. In American cities no record of the nutrition of the entire school population has been made. In 1907 in New York the Committee on Physical Welfare of School-Children reported 13 per cent of 990 children, selected as typical of the whole city, to be suffering from malnutrition. A similar investigation of 10,090 children in Chicago in 1908 revealed 12 per cent badly nourished in all grades, the proportion decreasing from 15 per cent in the kindergarten to 6 per cent in the fifth grade and above. Wherever an attempt has been made to include all classes of children in the examinations, the percentages found suffering from acute malnutrition run from 10 to 15. Where only schools in the poorer districts are included, the percentages are far higher, and vary between 20 and 40. However, it must be remembered that children from the poorer districts far outnumber those in other schools, so that in point of figures the actual proportion of children suffering from malnutrition is probably nearer the second estimate. Doctor Thomas F. Wood, of Columbia, gives 25 per cent as the estimate for the school population of the whole country.

"The longer a medical officer remains at school inspection," remarks Doctor Hope, of Liverpool, in a report for 1912, "the more severe becomes his standard of nutrition, and the less readily does he pass a child as being well nourished."

The truth of this is shown in the British reports, which from year to year show in the aggregate an increasing proportion of children grouped in the division of subnormally nourished. In 1911 the average per cent reported was 11

for twenty-three communities; in 1912 the average for twenty-seven cities was 13. The percentages from the different places varied from 3 to 30.

In Stuttgart all the children were examined during six successive years, and classified according to the Gastpar method described. Out of 65,000, 24 per cent fell in the group of "poorly nourished, with anemia," and only 20 per cent merited the grouping "good."

Malnutrition and Retardation.—In an address before the superintendents' section of the National Education Association in 1913, Superintendent Francis, of Los Angeles, gave as his opinion that a systematic provision of lunches in the schools would greatly reduce the cost of retardation. Principals of Philadelphia schools have reported a substantial reduction in afternoon truancy following the introduction of lunches. In 1894 lunches were introduced into Milan schools, where the average daily attendance was only 72 per cent of the enrolment. This percentage increased after the introduction of the lunches to 94 per cent in 1905. A survey of the factors making for non-promotion in Manchester, Connecticut, showed that of all the children who failed of promotion 25 per cent were suffering from malnutrition as opposed to 9 per cent among those promoted.

Among mentally defective children, the proportion that are badly nourished is reported in Germany, England, and this country as being from 60 to 65 per cent. Lunches are being introduced into the special classes as a partial remedy for this condition.

Planning of Dietaries.—The problems of school dietaries are: *first*, how to assure the children a lunch that shall satisfy the appetite, yield a fair proportion of the day's total ration, and make up for deficiencies of protein and fat found in the children's home diets; and, *second*, how to do all this while keeping the cost of food, preparation, and service within the ability of the children to pay. It must be remembered that the children's unit of payment is a cent.

This problem has been most satisfactorily solved in Bradford, England, where the meals are so well planned and conducted as to serve as a model not only for England but for us as well. There are seventeen dinner menus served in rotation, thus providing the very necessary variety. A sample dinner—meat pie, bread, green peas, gravy, and stewed fruit—yields a total fuel value of 894 calories, with 33 grams of tissue-building protein, 21 grams of fat, and 168 grams of starch and sugar. The cost of this meal to the city, including superintendence, preparation, and service, is three cents, and this is what the children pay.

Experience in planning dietaries in different countries indicates that if the ration is in accordance with the needs of *the average ten-year-old child weighing sixty pounds*, this may be varied up and down quite easily for the older and younger children. The following is a practical basis for a plan of the whole day's needs:

Protein	60 grams yielding	240 calories.
Fats	40 grams yielding	360 calories.
Carbohydrates	250 grams yielding	1,000 calories.
Total	350 grams yielding	1,600 calories.

The nutritive ratio of this dietary is 1 to 4.8.

A study of the food values of the lunches in use in well-organized systems of school feeding in England, Switzerland, and Germany indicates that they furnish over one-half of the day's total ration—a little over one-half of the protein and not quite half of the fat.

Money Value and Food Value.—If there is no school lunch provided, a large and growing proportion of the children buy their own lunches from venders at the door, and at near-by shops. The average value of one-cent lunches in Philadelphia is 114 calories; children buying of the venders are able at best to get only 52 calories. Moreover, the street food is unclean and in many cases adulterated. Most school principals and teachers have met with the serious and pernicious

influence of the cheap, adulterated candy and pastry sold at the inevitable parasitic "little candy store" near most schools.

Present Extent of the School Feeding Movement.—Lunches in the elementary schools form part of the regular educational provisions in practically all the great countries of Europe. The movement has been made the subject of national legislation in France, Switzerland, Holland, Great Britain, Denmark, and Bavaria. It is national in scope, with direct support by the municipalities in Germany, Italy, Sweden, Norway, Finland, Austria, and Belgium. It has been started in Spain and Russia.

In America lunches are commonly provided in the more progressive high schools. There are eighty-nine cities, in twenty-eight States, where lunches have been introduced in the elementary schools, and six States in which the movement for warm lunches in rural schools is under way.

The Progressive party included school feeding in its 1913 platform for New York State, and Colonel Roosevelt has gone on record as favoring its incorporation in the State platforms generally. The Socialist party has long had school feeding as one of its immediate demands. The Massachusetts Legislature, early in 1913, passed an act providing that school systems might use funds for the support of lunches, subject to a referendum vote of the citizens. As the question is bound to come up for consideration in many State legislatures, the following act has been formulated on the basis of the best available experience to serve as a model for school systems contemplating such legislation:

AN ACT TO PROTECT AND CONSERVE THE HEALTH OF SCHOOL-CHILDREN AND PROMOTE THEIR EFFICIENCY BY PROVIDING MEALS AT COST IN THE PUBLIC SCHOOLS

SECTION 1. Any board of education in a school district may provide for serving lunches and selling them to pupils attending the public schools at such prices as it may fix, not exceeding the cost of purchase and preparation and service of the food.

SEC. 2. Said board of education may employ a director of school lunches and other necessary assistants, and fix their rates of remuneration and draw up rules regulating the conduct of the lunches and the duties of the said employees.

SEC. 3. Said board of education may appoint for the proper supervision of the school lunches a school-lunch committee which shall include in its membership the superintendent of schools, the chief medical inspector, and the director of school lunches or such other persons as the board may designate.

SEC. 4. The expenses incurred under the provisions of this act shall be paid in the same manner as are the ordinary expenses for the support of public schools in the several school districts.

SEC. 5. This act shall take effect immediately.

NOTE.—See the writer's volume on the above subject.—ED.

CHAPTER XIV

OPEN-AIR AND OPEN-WINDOW SCHOOLS

The Problem.—The open-air school movement has gained a definite place among the educational and ameliorating forces of the United States. Its development has been rapid, for it is based upon the experiences and knowledge acquired by an increasing number of social workers and social agencies over a considerable number of years. Settlement workers, agents for charitable organizations, tuberculosis agents, visiting nurses, juvenile court workers, infant welfare nurses, probation officers, church visitors, teachers and members of school boards, and a growing number of interested citizens have made the acquaintance of thousands of children living under our rapidly changing modern conditions.

In increasing numbers these representatives have gone into the homes where poverty, sickness, delinquency, defectiveness, and all manner of unfortunate circumstances have called them on their errands of neighborliness. They have come close to the homes of the poor and have acquired a first-hand knowledge of the handicaps under which less fortunate people live. The bearing which untoward circumstances have upon the lives of children has impressed itself upon these workers as of paramount importance to the community and the nation. The earlier efforts were for measures of relief. They endeavored to secure braces for crooked legs and crooked backs, to get hospital care for children who were ill, to acquire an understanding which would help them to get boys and girls out of trouble, or to secure them employment; or they went from the compulsory education department to force children into school; or from the courts to secure infor-

mation about dependency and delinquency. These workers found large numbers of children anemic, undersized, and ill prepared physically and mentally for the duties of life. They learned that thousands of them had dropped out of school at an early age and that the school experience had effected little or no beneficial result.

A procession of something like 100,000 children a year files before the courts of the country, and the stories that have been confided to the ear of the friendly judge by troubled children and heart-broken parents have been challenging the attention of the nation. In following the trail of these little people into their homes, probation officers have become possessed of information and understanding which throws a great deal of light on the reasons why children drop out of school, as well as why they fail in their studies and cannot keep up with the procession, why they get into trouble and do not fit into the industrial life of the community. From purely palliative and remedial work a widening number of interested people have been challenging the situation and demanding a constructive programme. What the problem is for one disease the following figures suggest.

Influence of Medical Inspection.—Medical inspection in the public schools has had a great bearing on the problem. In 1911 over five hundred cities in the United States had a system of medical examination of school-children. Between one-half and two-thirds of the children examined were found to have one or more physical defects sufficiently pronounced to need attention, many of them so serious as to handicap the child in his school work, and still others so marked as to make his attendance at school dangerous to himself and to others.

Discovering defects was the first step, but only the first. So far, less than one-half of the defects discovered have been corrected. This work is becoming more efficient as school nursing is provided, but there is still need for increasing the facilities for hospital, dispensary, and dental care, for eye defects, and for operations for adenoids and tonsils.

In a recent book, "The Prevention of Destitution," Sidney Webb writes as follows of medical inspection and its results in England:

When we get the child to school, knowledge of its condition becomes forced upon the community. The first results of systematic medical inspection are bringing home to our minds what every teacher knows, namely, that a large proportion of the children are not in a fit state to have the public money spent on teaching them, because they are suffering to such an extent from neglect as to be unable to obtain full advantage of the instruction. What emerges from the cautious summaries of the chief medical officer of the Board of Education for England and Wales (Scotland and Ireland being at least as bad) is that out of all the 6,000,000 children in the elementary schools about 10 per cent suffer from serious defects in vision; from 3 to 5 per cent suffer from defective hearing; 1 to 3 per cent from suppurating ears; 8 per cent have adenoids or enlarged tonsils of sufficient degree to obstruct the nose or throat and to require surgical treatment; 20 to 40 per cent suffer from extensive and injurious decay of the teeth; 40 per cent have unclean heads; about 1 per cent suffer from ringworm; 1 per cent are affected with tuberculosis of readily recognizable form; and ½ to 2 per cent are afflicted with heart-disease.

Infant Welfare Organizations.—One of the newer and most fundamental movements has gone straight to the heart of the problem of physical welfare of children, and that is the work of the infant welfare organizations. These people have found that we have about 250,000 baby funerals in this country annually of children in their first year. This means about 150 out of every 1,000 babies. This is better than the figure in Russia, where it is 263, but it is a sad comparison with New Zealand, where it is less than 75. These were our figures as given by the American Association for the Prevention and Study of Infant Mortality in 1911.

It has been stated that the mortality among infants is one of the best indexes of the community's concern for human life. The story of such mortality as this is not fully told in the frequent use of the white hearse, for many children survive only to emerge from the dangers of babyland with im-

paired physique and weakened resistance. All children must be babies first, and the candidates for the schools must pass through the ignorance and dangers of babyland; and these figures show that being a baby is about the most hazardous pursuit in the world.

TABLE[1]

DEATH-RATE FROM TUBERCULOSIS

AGE PERIOD	DEATH-RATE FROM TUBERCULOSIS (ALL FORMS) PER 100,000 POPULATION OF THE STATES INCLUDED IN THE REGISTRATION AREA IN 1900.[2] (94,205 DEATHS)						PER CENT WHICH RATE IN 1911 REPRESENTS OF THAT IN 1901		
	1911			1901					
	Both sexes	Males	Females	Both sexes	Males	Females	Both sexes	Males	Females
All ages:									
Crude rate	158.9	179.4	138.0	188.8	199.9	177.6	84	90	78
Corrected rate[3]	150.1	167.0	134.4	181.3	189.3	173.8	83	88	77
Under 5 years	126.7	133.3	120.0	138.2	147.7	128.6	92	90	93
5 to 9 years	31.1	31.4	30.9	31.0	31.6	30.4	100	99	102
10 to 14 years	35.6	27.6	43.7	39.4	26.5	52.4	90	104	83
15 to 19 years	115.3	99.9	130.4	144.2	118.1	169.1	80	85	77
20 to 24 years	188.0	190.9	185.2	251.9	247.3	256.2	75	77	72
25 to 34 years	217.8	230.4	204.6	282.6	287.0	278.2	77	80	74
35 to 44 years	228.4	278.5	175.5	254.7	285.9	221.6	90	97	79
45 to 54 years	191.0	253.5	124.6	208.8	256.5	159.0	91	99	78
55 to 64 years	193.6	253.0	133.4	220.2	267.3	173.9	88	95	77
65 to 74 years	194.3	229.9	160.6	253.5	284.3	224.3	77	81	72
75 years and over	158.6	177.1	143.1	241.0	256.3	227.5	66	69	63
25 years and over:									
Crude rate	209.3	249.1	168.1	251.0	277.7	223.7	83	90	75
Corrected rate[3]	206.5	248.8	168.6	249.1	277.6	223.6	83	90	75

[1] From 1911 U. S. Mortality Statistics.

[2] Includes Connecticut, the District of Columbia, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Registration area included 63.1 per cent of the population.

[3] Corrected on basis of standard million of England and Wales, 1901.

NOTE.—The column for "both sexes" third from the right side means, for example, that the crude rate from tuberculosis for all ages was only 84 per cent of what it was in 1901, and that the rate for children from 5 to 9 years was unchanged.

Our schools, then, are constantly recruited by an army of little people of weakened resistance, ill nourished, improperly cared for, and poor material to be wrought upon by the school régime. The school process has gone on without

that consciousness of individual needs, that discriminating concern for each child, to which it would seem that the most handicapped, at least, are entitled. The general tuberculosis crusade with its carefully worked out programmes has been one of the most pronounced factors in setting the community at work.

The open-air school is one of the pieces of social machinery that have come into existence because of these experiences and the convictions which have grown out of them.

Open-Air Schools at Home and Abroad.—The open-air school, in the modern acceptance of the term, was started in Charlottenburg in 1904 as a rest-recovery school. It was a fresh-air camp for debilitated children, located in a beautiful pine forest just outside Charlottenburg, a suburb of Berlin.

The German people were first in the field in sanatorium treatment for tuberculosis. They soon discovered that if debilitated children were sent to the sanatorium, while they gained in health they lost in educational progress. On the other hand, if they were kept in the public schools they deteriorated in health.

The now famous Waldschule provided the missing link and became a real educational experiment, but with the teaching always secondary to health. New methods of instruction were devised, and a rich and varied programme was worked out for the children. Their school day included, besides the ordinary recitations, gardening, walks in the forest, nature-study work, five feedings a day, sun-bath, gymnastics in the open air, and a rest period from one to two hours in length.

In his report for 1912 the chief medical officer of the Board of Education in London makes the following statement:

> Open-air education was practised by the Greeks and Romans, was commended by the educationalists of the seventeenth and eighteenth centuries—Locke, Rousseau, and Pestalozzi—and has been attempted in various forms since 1876, when Bion, of Zurich, initiated the children's country-holiday movement. The growing of the towns, the in-

crease of social effort and experiment, and the movement for the prevention and treatment of tuberculosis have, no doubt, been factors in the recent progress of the open-air school movement. In 1907 the London County Council established a school of this kind at Bostall Wood, and there are now about a dozen schools in different parts of the country.

France, Switzerland, Italy, and Hungary have open-air schools with similar curricula and management. In general, the tendency in Europe is to construct open-air schools in the country on a plan which permits giving the children day and night care until their recovery is assured.

The first open-air school in the United States was established in 1908 at Providence, Rhode Island. There are at the time of writing more than 500 open-air schools and open-window classes in the United States. Passing through the makeshift period, when ferry-boats, piazzas, and tents were used for schoolrooms, the open-air school movement has progressed to the stage where school architects are incorporating specially designed rooms for such work in the plans of their most recent buildings.

Principles and Methods of Open-Air Schools.—The method and aim of the open-air school is to furnish the child with a programme suited to his needs. It is not merely school in the open air; it comprises a way of life and a system both of education and medical treatment. The children are admitted to such schools through a careful medical examination, the aim of which is to secure accurate knowledge of the child's physical condition. This information furnishes the guide for such medical treatment and correction of physical defects as are necessary to establish the efficiency of the pupil. A daily inspection by the physician in charge gives opportunity to check any temporary indisposition and to study the effect of the modified régime upon the individual child.

In most open-air schools temperature and pulse are recorded at least once daily and the children are weighed at stated intervals. A daily cold shower-bath or a weekly warm

cleansing bath is ordinarily given at the school. Meals are served from once to three times during the day. The physician plans the diet list and often orders special diets for badly undernourished children.

A rest period usually follows the noon meal. All the children recline on canvas cots or steamer-chairs for a period varying from forty-five minutes to two hours. Ordinarily, two-thirds sleep regularly; at any rate, they rest. Where a child does not waken at the end of the period and has seemed to be in special need of rest, the teacher may permit him to remain asleep until the close of the school day.

The nursing supervision extends from the school into the home. The majority of open-air schools in this country are in the congested portions of cities, where the daily lives and habits of children are not so well or so carefully regulated as they would be in smaller communities. The children go to bed late and usually sleep with other persons in poorly ventilated rooms.

The 1912 report of the London Board of Education points out "that it would be difficult to exaggerate the physical and mental injury its children suffer from a lack of sufficient sleep and genuine rest. Large numbers of children who require for physical health at least ten hours' rest at night are, in fact, obtaining much less than that amount; and this one condition is responsible for not a little of their physical unfitness and mental dulness. Further, there are various maladies from which they suffer and which are being revealed by medical inspection, which call for the therapeutic remedy of rest."

The teacher in a Boston open-air school says that the open-air school must, in an unusual sense, be mother and school both. "It is found," she says, "that many of our pupils are up until all hours of the night and out again early in the morning. They are improperly clothed, improperly fed, never bathed, and live in rooms that are never ventilated and are occupied by three, four, and five others. Often they come to

school unfed, not always because there is no food, but because there is no regular living and food has not happened to come their way. If it does, it is more than probably not the right kind. It may have been soggy, half-baked bread with a little pepper on it to 'keep them warm.' "

The nurse who cares for the children at the school goes with them to their homes and tries to enlist the co-operation of the parents in giving the child better food, better ventilation, and better sleeping-quarters. In the Chicago open-air schools it was found necessary to make a ruling that any child who persisted in remaining up after eight o'clock at night, without good reason, should be excluded from the school.

The influence of the nurse has often accomplished the removal of a whole family from insanitary quarters where privacy and decency were well-nigh impossible to homes which corresponded more nearly with hygienic standards. The nurse accompanies the children to the dispensaries, investigates at once in case of absence from the open-air school, and, in general, watches over the physical well-being not only of the pupil himself but of his family.

Structure and Equipment.—The distinctly open-air school is one where the air is practically the equivalent of outdoor air. Windows and wind-breaks are so placed as to control the entrance of storm and wind.

The first open-air schools in the United States utilized existing buildings by modifying the window structure, or erected cheap temporary shacks to serve as their experiment stations. Thus Providence established the first school in an abandoned schoolhouse, Boston on the roof of a park refectory, Pittsburg on a hospital balcony, New York on disused ferry-boats, while Chicago built asbestos shacks on the roofs of convenient buildings in the tenement districts.

Climate and local conditions determine absolutely the type of building best suited for open-air work in any particular community. The rapid increase in the number of open-air schools has led several cities to make permanent provision in

their regular school system for open-air work. Boston, New York, and Oakland, California, are among the cities which have definitely decided to incorporate fresh-air rooms in all new buildings to be erected.

This new development in schoolhouse architecture is more marked as yet in those Western States whose climates permit of open windows and no heat during a good part of the school year.

In California practically all the new buildings are being erected in such a way that they can be thrown entirely open on at least one side. In the Eastern cities, where ground is at a premium and transportation is poor, more roofs have been pressed into service. Cleveland has a magnificent new building, the roof of which was specially planned to accommodate four open-air schools. The children are taken to the roof by an electric elevator, and play-space, recitation-rooms, rest-rooms, kitchen, and dining-room are all provided on the roof. Detroit will erect two such buildings within a year. Many cities are modifying the style of windows in their schoolhouses, substituting for the old-style windows hinged windows, to swing either in or up and to occupy a larger portion of the wall space.

Another recent suggestion is that of substituting open verandas for the long, dark hallways of the ordinary schoolhouse. The architect claims that such a building would be much less expensive to construct and far safer in case of fire. It would permit of long windows opening on the verandas, which could be thrown open in case of favorable weather.

Portable buildings are used in the yards of schoolhouses in many places. In Europe the Doecker portables are used very largely for open-air work and were awarded a gold medal at the Third International Congress on School Hygiene.

The open-window room is a room in the ordinary school building in which an attempt is made to approximate outside conditions by regulating the amount of heat supplied and by keeping the windows constantly open. Here, also, wind-

shields of various devices are used to keep the air from blowing directly on the children. The temperature in cold weather averages about fifty-five degrees in such rooms. The contrast between the freshness and purity of the air in the open rooms and that in other rooms of the same building with artificial ventilation in use is extremely marked. The difference in temperature is made up by extra feeding and by extra clothes. There is always the need of careful medical supervision, and it would be a hardship to the children to subject them to the lower temperature without adequate provision for clothing.

In the schools of Chicago children are furnished with lumbermen's boots or other foot-protection, and with sweaters or Eskimo suits for schoolroom use. There is always need that either the physician or teacher, especially the latter, shall see to it that the children put on wraps when the temperature is low, as they will often themselves declare they are warm enough and fail to put on the additional garments.

The individual equipment for a child in an open-air school includes boots, Eskimo suit or other warm, loose garments with gloves or mittens, sleeping-bag, blankets, cot, tooth-brush, paper napkins, and thermometer.

The school equipment must include, in addition to desks, blackboards, and the ordinary furnishings of the schoolroom, provision for serving meals and some kind of locker in which the suits and other articles of individual equipment may be kept.

Results of Treatment.—So uniform has been the record of the mental and physical improvement of the children under the open-air régime that detailed statements of gains seem hardly necessary. We expect increases in weight, height, chest-expansion, and muscular power, improved nutrition, better color, and more erect carriage; and we know that with these physical gains will come greater alertness and more power of concentration, consequently better scholarship and more regular attendance.

It is of special interest, however, to compare these records with those of children in the public schools. Such a comparison

was made during the school year 1912–13 by Doctor Harold Brown Keyes between the children in the outdoor classes of the Horace Mann School, Columbia University, and corresponding grades indoors in the same school. These are all supposedly normal children from good homes.

The hemoglobin tests given at a six months' interval showed that, although both indoor and outdoor children lost in hemoglobin, the outdoor children lost only about one-ninth as much as the indoor. A comparison between the past attendance-records of fourteen fourth-grade children in the open-air school and indoors gave a better record of 4.3 per cent in favor of the outdoor schools. The children were two years older, however, than when the first record was made.

A record of contagious diseases kept during the year showed that 12.5 per cent of the outdoor children had contagious disease to 17.9 per cent of indoor children. No contagious disease "went through" an outdoor room, as happened in one of the indoor rooms. There was far less absence for illness.

In the mental tests, to quote only two examples, the third-grade open-air school children tested in formal English showed a 20 per cent improvement from December to May, while the indoor gained 13 per cent; the outdoor fourth grade gained 7 per cent and the indoor fourth grade lost 3 per cent. In arithmetic, the third-grade open-air improved 20 per cent and the indoor 6 per cent, while the fourth grade made 41 per cent in the open air and 35 per cent indoors.

The supervising physician of the Bradford, England, open-air school reports that the results for 1912 showed remarkable gains in weight and health and increase of the percentage of hemoglobin in the blood. The average attendance for the year was 138.3 and the average duration of attendance rather more than five months. The average gain in weight was about four and one-half pounds. There was an increase of 21.5 hemoglobin, and the chest-measurements showed an average increase of 1.12 inches.

The school medical officer at Halifax, England, draws certain general conclusions from his additional experience in the treatment of debilitated children. He states:

(1) Cases of malnutrition with its attendant anemia, debility, etc., give uniformly good results under open-air school treatment, unless counteracted by home influences at night and week-ends.

(2) Simple tubercular glands are quickly influenced. In the three cases reported "fair" or "worse," there were lung signs sufficient to account for the poor progress.

(3) Heart cases if compensated, and enfeebled circulation, respond well.

(4) Early manifest phthisis responds better than the latent or suspected type characterized above as pretubercular. This confirms our previous experience that a child saturated with tuberculous poison, without manifest signs, is a more difficult problem than the child with an open lesion.

Should the children themselves be asked how the open-air school has affected them, they would almost without exception give unconscious testimony to the change which has been wrought in their mental attitude as well as in their physical condition.

A little Italian boy in Boston, writing to his teacher in an English exercise, says: "I come to school to learn. When I went through the rooms I am going to college, and after I went to college I am going to work in an office, and I thank you, Miss Dally, for making me smart, and I thank you for the malted milk, and I thank you for bringing me into the yard."

An Open-Air Letter.—Another child in a Chicago open-air school wrote the following autobiography for *The Open Air Smile*, a little paper which is published monthly by the children attending the Elizabeth McCormick open-air schools:

I was born in Russia, May 25, 1899. I can speak the Russian language and my nationality is Jewish. I was born in a little gray house in a little country town near the city of Kiev.

When I was two years old my downfall began. First I fell sick

and had the scarlet fever, and as soon as I was cured of that I caught diphtheria, and after I was cured of that I caught pneumonia. I stayed in bed for a year and I never got out of bed for that long time. I believe that all of these sicknesses left me tubercular.

When I was six years old I came to America and to the city of Chicago. Everybody had told us in Russia that gold was lying everywhere in the streets. I started to go to school at the Garfield school. Later we moved to a different street, so I took a transfer to the Langland school, and later on we moved again, and then I came to the Goodrich school, which I attended a couple of years. When I was finally in the seventh grade I was sent out to the Winfield Tuberculosis camp. I stayed there six months because I was charged with having tuberculosis. Those six months passed away so quickly that it seemed to me like six weeks. I think it was the happiest time of my life staying out there.

Everybody was very kind and nice to me out there. They were very sorry when I went home, but when I finally came back from Winfield I was a changed fellow. Hardly anybody recognized me, because I was not the sick little fellow that I was when I went to Winfield, but a big, strong and healthy boy with cheeks like roses. Later on I was put in the Foster Open Window Room, where I am now in the eighth grade.

Other items which show the results of the open-air school upon the child's attitude follow:

When I was on the street car and was going to open the window the conductor said that I should keep the window closed. I told him that I was not used to closed windows. There was a lady sitting right next to me and she said that I was right. I did not open the window, but I went out where the motorman stands. I told him that and he laughed about the conductor. I asked him to open the window and he opened it. When I got home I told my mother and she said I was right.

We almost lost two of our classmates this month. Harry Row's and Olga Zemit's fathers moved out of the district. All their brothers and sisters got transfers and are going to another school, but Olga and Harry take the car and come to our school every day. They said their mothers did not want them to leave our room because they were so much better than they used to be, and they were afraid they would not keep so well if they left us.

When I told my mother that we did not have any school for a whole week, she said, "I bet you will be two pounds less." When I got back to school and was weighed I was two pounds and a quarter less, so my mother was right.

Effect on Teachers.—The reflex action of the outdoor life on the teacher can best be stated by those who have experienced it. "Those who have tried the outdoor work have been capable of more prolonged labor with far less fatigue," says the teacher of the first Boston open-air school. "The work is heavier in an open-air class but I feel much more able to accomplish it. After the day's work I now return home fresh and do not suffer from the usual headache and dryness of throat that follow teaching in the ordinary room," comes from New York; while an Elizabeth McCormick open-air-school teacher testifies that backache, extreme fatigue, and nervousness have been overcome by the fresh air and sunshine on the roof.

A district supervisor of the Chicago public schools reports to the board of education in regard to the open-air school teachers who are under her direct supervision as follows:

When a teacher has twenty-five pupils who represent anywhere from two to seven different grades; when her recitations are interrupted by the call of a physician or nurse; when entire classes are put to rest for the day at the menacing demand of a "rise in temperature," she is obliged to meet the situation with cleverness and calm. How is she enabled to do this? Not alone because she is breathing the purest air this smoky city can bestow, but because her small number of pupils, her comprehensive knowledge of their physical, mental, and home conditions, her interest in their all-around development, have brought her into a close human relationship with them not often attainable under the conditions of the ordinary schoolroom. She is their intimate friend as well as their teacher.

The teachers pass on the enthusiasm for fresh air to their fellow workers, and gradually the impression permeates the teaching force that it is better to have the windows open and the room temperature lower. Engineers and janitors fall into

line, and presently the parents discover that school ventilation is a very live issue.

In December, 1913, the superintendent of schools in Middletown, Conn., issued what is supposed to be the first sweeping order to turn practically every school in the town into an open-window school. The parents were notified that beginning on a certain date the temperature in all schoolrooms would be lowered and the windows kept open; that care would be taken to keep draughts from blowing directly upon the children and any child who brought a written excuse from the family physician would be placed in a heated room. Parents unable to provide extra clothing for their children were to be helped by the board of education.

The influence which the open-air schools are exerting upon schoolhouse architecture has been indicated under the section on "Construction and Equipment."

With our increased knowledge of tuberculosis and the best means of avoiding it, and our realization of the large number of physically subnormal children in addition to those definitely tuberculous who would be benefited by the open-air school régime, the open-air school question is assuming large proportions.

The Pennsylvania school code already excludes from the public schools any person having tuberculosis of the lungs, whether it be teacher, pupil, janitor, or other employee. The result in Pennsylvania has been to stimulate the establishment of a large number of open-air schools which have been uniformly successful in caring for the excluded children.

In England the tuberculosis regulations of 1912 make the notification of all forms of tuberculosis compulsory. This means that English cities can now for the first time tell definitely how many tuberculous children they have for whom some kind of provision must be made in the public schools. The estimate of the examining medical officer of London is that at least 10 per cent, including the anemics and the malnourished, are suitable subjects for open-air schools.

Essentials of a Community Programme.—Most communities are becoming conscious of the needs of their school-children, and are endeavoring to create forces to meet these conditions. In *The School Review* for December, 1913, Frederick L. Hoffman estimates that in 1913 12,229 deaths among children and young persons of school age occurred in the United States from tuberculosis.

First. In the schools of every large city will be found certain children who have open, active tuberculosis, and who need sanatorium care where they can be given continuous treatment until the process is arrested. A part of each community's child-welfare programme should include a sanatorium built, equipped, and operated to serve the peculiar needs of children.

Second. There will be other children who should have the kind of care that is afforded in the hospital school, where the health of the child is the paramount issue, and the academic work is absolutely secondary and tempered carefully to the child's physical abilities. Boston has such a school. It is run under the auspices of hospital authorities and in connection with a hospital sanatorium. "Such a place is for children manifestly tuberculous who ought not to go to the regular public schools, or even open-air rooms, and yet who are not sick enough to require bed treatment in the hospital sanatorium." Some of the children go only for the day, others stay the whole week, returning Saturdays. There are many children of this type in the schools of a large city.

Third. There should be open-air schools where children may go during the regular school hours daily. These schools should have outdoor conditions of air, and the children should be selected and supervised in accordance with the medical and nursing régime described before. Feeding, rest, and careful co-operation with the home should be features of this programme. This school will deal with the anemic child, with contact cases, and with children who are predisposed to tuberculosis.

Fourth. The open-window room. Some of the most advanced cities are planning to have such a room in every school. To these rooms the children who need special consideration and care may be admitted. The temperature in such rooms is more easily modified, but the air can be kept fresh and invigorating by keeping the windows open, care being taken not to have the wind blow directly on the children, and to see that additional wraps are provided and that the children wear these wraps when they need them.

It seems to be necessary in our educational processes to learn our most vital lessons from defective, delinquent, and physically subnormal children. Not many years ago the only place to secure manual training was in the reformatories or correctional institutions. Madame Montessori and other educators have taken some of their most vital lessons from backward children. The best attendance in the Chicago schools during a recent term was in a room fitted up with manual-training and other similar devices and to which a lot of truant boys were assigned.

Any community that will provide along these lines for its special groups of children will in the process have learned that such facilities are also good for normal children. The ultimate aim and goal of the open-air school movement is nothing short of right conditions of sanitation, hygiene, and school opportunity for the 20,000,000 boys and girls in the schools of the United States. Children should not necessarily be sick or backward or wayward to enjoy privileges and processes which in a peculiar way appeal to child nature and satisfy its intrinsic demands.

NOTE.—See the writer's volume on "Open Air Crusaders."—ED.

II. SCHOOL SANITATION

CHAPTER XV

RURAL SCHOOL SANITATION

The Need for Rural School Sanitation.—In this chapter[1] only those features of school sanitation in which the rural problem differs from the general problem will be discussed. The difference lies principally in the arrangements and equipment adopted to make the school sanitary, as different means must be employed in the country from those employed in the city. Especially is this true in the one-teacher schools. Also, rural school sanitation is concerned with more than urban school sanitation on account of its wider field of influence. The following principal reasons why the rural school building and grounds should be made sanitary may well be reviewed:

First: So that they may be as attractive as possible to the pupils.

Second: So that the health of the school-children and teachers may not be endangered.

Third: So that the health of the community may not be endangered through diseases disseminated from the school by the children, or by other agencies such as the wind, rain, and animals, particularly insects.

Fourth: So that the children may learn directly what sanitation means, and may acquire sanitary habits in the school for use at home, both while pupils in school and in their lives after the school-days are over.

Fifth: As a demonstration of sanitation and of sanitary equipment to the citizens of the school district.

All of these factors should be borne in mind in planning the rural school. Consideration is seldom given to the *first*,

[1] See also chapter X on "Rural School-Health Administration."

since it is generally supposed that children take little notice of the sanitary arrangements of the school plant. This is true only to a certain extent. The insanitary outhouse is very repulsive to the children, especially to those who come from homes where clean, comfortable ones are provided. They are much more repulsive at an early age than later when the child has grown accustomed to the objectionable conditions. President John R. Kirke, of the Kirksville, Missouri, Normal School, tells of a boy who wanted to attend a "model one-teacher rural school" maintained on the normal campus as a demonstration and training school for students preparing for rural teaching. Children are brought in to the school each day in one large transportation wagon. This boy, nine years old, lived three miles from the model school and not on the wagon route. He was willing to tramp in to the school each day if allowed to attend, giving as his reason for not liking the district school near his home, "They haven't got any modern toilets out there."

The *second* reason is the one usually given for having a sanitary plant, but it is of no more importance than some of the others. Much sickness on the part of school-children comes directly from the school—poor lighting, bad ventilation, over or under heating, being some of the causes. Many diseases are contracted from other children either directly or indirectly. Insanitary outhouses are often the cause of the pollution of the water supply of neighboring farms or the source of disease spread about by flies and other insects. Only recently typhoid fever, which caused the death of two young women in the same family in Kentucky, was found to have resulted from the use of spring water contaminated from a school privy located a short distance away.

The *fourth* and *fifth* reasons seem to me to be very important. If the child, unaccustomed to sanitary practises at home, acquires sanitary habits at the school and becomes familiar with sanitary equipment, he will probably do what he can to provide himself with similar improvements at his

parents' home and later at his own home. In this way the school assists in the great campaign for improved sanitation now being conducted throughout the country. It assists not only the families represented in the school but also the entire community, for its sanitary equipment is to the community an actual demonstration. In many parts of the country little headway has yet been made in securing the adoption of facilities for making the farm and farm home sanitary. Several diseases that have almost entirely disappeared from cities with proper sewage-disposal systems are still rampant in rural districts. Hookworm, with which probably one million persons in the United States are now suffering, is confined wholly to rural territory, and typhoid, while not wholly a rural disease, is more prevalent in the country than in the city. When occurring in the city it is found usually to have come from contaminated food supplies, or milk or water brought in from the country. It is therefore desirable that country life be made more sanitary, not only for the benefit of those living in the country but also for city people as well. It cannot be accomplished wholly by preaching the dangers of disease, but must be accompanied by actual demonstrations of sanitary equipment. This it is the privilege and duty of the school to do. A sanitarily equipped farmhouse is a demonstration only to the few who have access to the house; the sanitarily equipped school is a demonstration to all, because all may visit the school.

It has been the experience of schools where such improvements have been installed that many persons have come to inspect the equipment. A few years ago the Farragut School, at Concord, Tennessee, installed a water system, water being obtained from a neighboring spring. Sanitary closets, shower-baths, and drinking-fountains were placed in the school. Few farmers of the surrounding country had ever seen such provisions before their installation in the school, but there are very few now who have not seen the school equipment;

and many, since seeing it, have installed similar equipment in their own homes. When the principal of a small consolidated school in a backward community in northern Louisiana had his schoolboys make screens for the schoolhouse windows, and for the windows of his house, which was located on the school grounds, he thereby introduced screens into the community. None had been used before. The neighbors of the school saw the benefits immediately, and the windows and doors of probably every house in the territory served by the school are now screened.[1]

In selecting equipment for the rural school it is necessary to bear in mind that it is to serve a wider sphere of usefulness than that of making the school sanitary. Its *adaptability to the home* should receive strong consideration. When equipment suitable to the home as well as to the school can be obtained, it should in general be selected in preference to equipment suitable for school use only. Equipment should be obtained, whenever possible, within the reach, so far as the cost is concerned, of the average family of the community.

The Sanitary Rural School Plant.—In locating, building, and equipping the rural school the following points relative to sanitation should be observed:

(1) The yard should be sufficiently dry to be used as a playground at all times except on unusually wet days.

(2) The building must be well enough built to be comfortable on cold, windy, or wet days.

(3) The building must be properly heated, ventilated, and lighted, and the interior decorated in the colors most restful to the eyes.

(4) Proper arrangements must be made for cleaning the building.

(5) A supply of pure drinking water must be available, also suitable arrangements for washing hands and faces.

[1] See bulletin on "Consolidation of Rural Schools and Transportation of Pupils at Public Expense," by the writer. (Bureau of Education, Washington, D. C.)

(6) The grounds must be free from filth of any sort, especially from decaying food material or animal refuse.

(7) Clean, sanitary toilets must be provided.

The School Lot.—The school, if possible, should be located on a site naturally drained, so that artificial drainage is unnecessary. If such a lot cannot be secured, the site should be thoroughly underdrained with tile pipe. Open ditches should not be made on the school grounds, as they are not only unsightly but are always an attraction to small boys, and wet feet and clothes are bound to follow. Even with the yard well drained, gravel, board, stone, or cement walks should be built from the road to the doors of the building and from the building to the outhouses, so that the children may keep their feet dry under all conditions. Moreover, the space under the building should be thoroughly drained, as well as the yard itself.

Lighting.—Little need be said in this chapter regarding the building itself, since what has been said in the chapter in this book on school buildings applies to rural schools as well as to city schools. There are, however, special features concerning the lighting, heating, and ventilation of the rural school, particularly the one-room school, that require mention here.

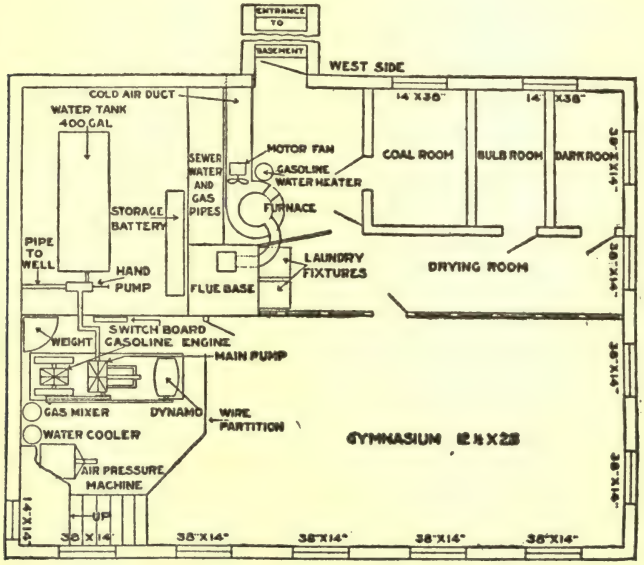
The great majority of rural one-teacher schools are lighted from windows on both the right and left sides of the room; many have windows on three sides; and one-room school buildings with windows on *four* sides are not uncommon. The best arrangement is generally conceded to be with windows placed on the left and rear. Where the windows are placed on opposite sides, a cross-light results which is assumed to be tiresome to the eyes. In buildings with this arrangement, shades should be provided, so that the light from the lower half of right-hand windows may be cut out. Under no circumstances should desks be placed *facing* windows. Light coming to the children from directly in front of them is injurious to the eyes, and while it may not always cause permanent

injury it does cause eye-strain and headache, and renders the children unfit for the best work possible. Whenever convenient, the building should be placed with the windows facing the east or west so that sunlight may enter. The windows should be placed high, extending nearly to the ceiling, and the total window space should be equal to or exceed one-fifth of the floor space. If the walls are tinted a light gray, a soft, diffused light is distributed evenly about the room, restful to the eyes and helpful in permitting the pupils to work with the greatest ease. Glossily finished walls or blackboards must be avoided, since they cause a direct reflection instead of a diffusion of light. Windows on the right and rear should be high and of single sash, easily opened for ventilation and air movement.

Heating and Ventilation.—The usual method of heating the small country school is by the means of a single stove placed in the centre of the room with a stovepipe ascending directly upward into a brick chimney the base of which is supported on the cross-beams in the ceiling. This is uneconomical, since much of the heat is lost through the chimney. It is unsatisfactory in many ways, but particularly because of the uneven temperature resulting in the room, especially on cold and windy days. A slight improvement is made when the chimney is placed at one end of the building, the stove near the other end, and the stovepipe suspended from the ceiling the length of the room. A much greater improvement is easily and cheaply made by surrounding the stove with a sheet-iron jacket standing a few inches from the floor and projecting a foot or so above the stove. All direct radiation is then cut off; the air inside the jacket is heated, rises, spreads about near the ceiling, and gradually settles downward. Cold air from near the floor is drawn in under the jacket. As a result a circulation is created which results in comparatively even temperature throughout the room. If the jacket fits about the stove properly, the stove may be placed in one corner of the room with entirely satisfactory results, provided

the building is ordinarily weather-tight. Stoves built with jackets may be purchased at very reasonable prices and are usually more satisfactory than the ordinary stoves with makeshift jackets.

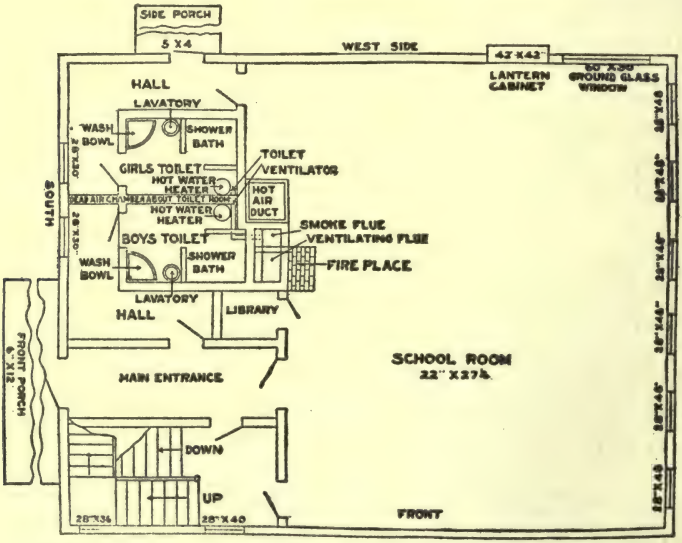
Such an arrangement as just described does not especially improve the ventilation. However, jacketed stoves with



BASEMENT PLAN, MODEL RURAL SCHOOL, KIRKSVILLE, MO.
Courtesy United States Bureau of Education

ventilating attachments are manufactured by several firms and are quite satisfactory. In these the jacket fits closely to the floor, with an opening either through the wall or through the floor so that fresh air from outside the building may be drawn in to replace the heated air rising from inside the jacket. Thus a constant supply of fresh air is being brought into the room. Provision must be made, however, for the removal of the foul air coming from the lungs and bodies of the children. This foul air, as is generally understood,

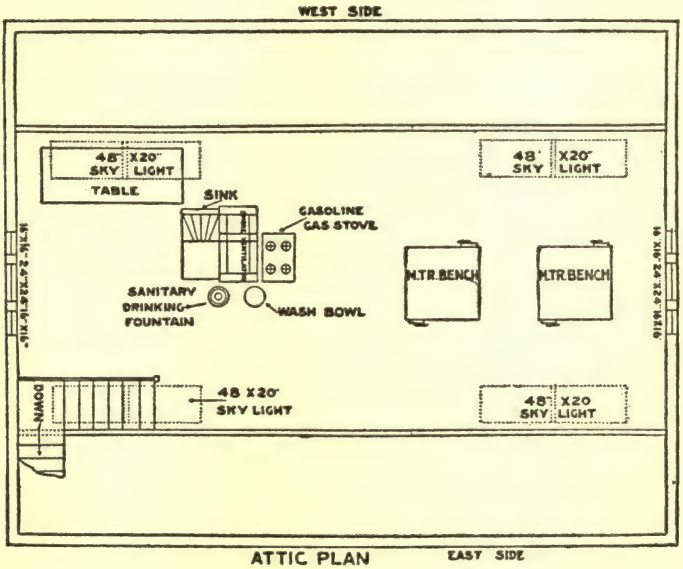
settles to the floor of the room. It is most easily removed, if the chimney is of brick and extends to the floor of the building, by removing a few bricks in the bottom of the chimney near the floor. An upward draft is created in the chimney by the heat from the stovepipe. This draws the foul air from the floor. A circulation is created, the heat of



FIRST FLOOR PLAN, MODEL RURAL SCHOOL, KIRKSVILLE, MO.
Courtesy United States Bureau of Education

the stove drawing in fresh air from outside the building, causing it to ascend and spread throughout the room. It is then taken into the lungs of the children, exhaled, and finally settles to the floor, from whence it is drawn off through the chimney by the waste heat in the stovepipe. If the brick chimney does not extend to the floor, an escape for the foul air is made by use of a large stovepipe extending from within a few inches above the floor upward to the chimney, surrounding the regular stovepipe before it enters the chimney. Tests made with these jacketed stoves and ventilating attachments

prove them to be both satisfactory and economical. The stove may be placed in one of the corners of the room as much out of the way as possible and it will heat the room to a sufficiently even temperature and supply every part of it with fresh air. Mere shields of iron to protect the nearest pupils



ATTIC PLAN, MODEL RURAL SCHOOL, KIRKSVILLE, MO.
Courtesy United States Bureau of Education

from the heat are not "jackets" and do not provide for thorough movement of the air.

The writer has seen several one-teacher schools heated with ordinary hot-air furnaces placed in cellars. This necessitates the digging of cellars and is, of course, somewhat more expensive, although often the cellars may be used for woodwork shops, for agriculture, or other purposes. The plan has the advantage that all heating apparatus is removed from the schoolroom and so much space saved. The room is no more satisfactorily heated, however, than with the jacketed stove,

and no better ventilation is secured. Probably the extra expense, except where two or more rooms are to be heated, will not ordinarily justify the installation of the hot-air furnace except where new buildings are erected.

Ventilation without the jacketed stove or hot-air furnace is difficult to accomplish. With the ordinary stove it is probably best obtained by arranging the windows so that they may be lowered from the top, or by using a window-board. This is a board, eight to twelve inches wide, fitted into the lower part of the window-frame on the inside of the sash. It slopes inward so that the top is four or five inches from the sash. When the window is raised at the bottom, fresh air enters between the window and the board and is projected upward into the room in such a way that no draft is created on the children. Instead of a board, window-glass in a special sash is frequently used. This has the advantage of cutting out no light. Rooms should be flushed with fresh air at recesses and frequently at other times. Direct drafts on the children as seated should be avoided.

Cleaning the Schoolroom.—The method of cleaning the ordinary country school building is given little attention. In probably more than half of the one-teacher country schools the janitor work is done by the teacher or by one of the older boys. The buildings are swept usually once or twice a week and with the corn broom—sometimes the floor being sprinkled with water before the sweeping. After the dust has settled it is customary to dust off the furniture with a feather duster, driving the dust into the air to settle again on the desks and chairs. It is almost needless to say this is unsatisfactory and insanitary.

It will be many years before the great majority of country schools are supplied with many of the modern sanitary appliances for cleaning now being used in city schools. The sweeping will be done for some time to come with the ordinary broom. Methods of sweeping, however, may be improved. Sprinkling the floor is effectual in preventing the

raising of dust but it binds the dirt to the floor and only part of it is removed. A simple improvement consists in the use of moist sawdust sprinkled on the floor and swept along with the dirt. This holds the dust and leaves the floor clean. Many patented materials are on the market for use on the floor to prevent a dust when sweeping. Most of them may be used several times. They are cheap, economical, and satisfactory in every way. The oil brush is also cheap and satisfactory. This is a sweeping-brush carrying a reservoir from which kerosene oil is released slowly enough to keep the bristles of the brush moistened. Sweeping with it is clean and dustless. Even with the use of patented dust-holders or of the oil brush, the floor must occasionally be washed with hot suds. Much of the dirt may be kept out of the building by providing some kind of iron scraper at the stoop, and encouraging the boys and girls to scrape carefully the extra mud and dirt from their shoes before entering. The scraper and a corn-husk or bristle mat at the door would help keep the floor clean, and their use might establish habits in some of the boys and girls which would be practised at their homes, and for which many overworked, tired, and weary mothers would thank the teacher.

The ordinary feather duster should never be used. Large cloths moistened in water or oil should be used instead, and with them the desks, chairs, and all furniture should be carefully wiped each day.

The Water Supply.—The dangers from impure water, dirty water, the common drinking-cup, and the unclean drinking-cup are discussed elsewhere in the book, so that nothing further needs to be said here. In regard to the supply, it may be said that every country school should have a handy source of pure water either on the school grounds or near the school grounds, and under the authority of the school officials, so that the purity of the water may be protected. If the source of the water supply is a well, it should be so located that pollution from outhouses or barnyards may not

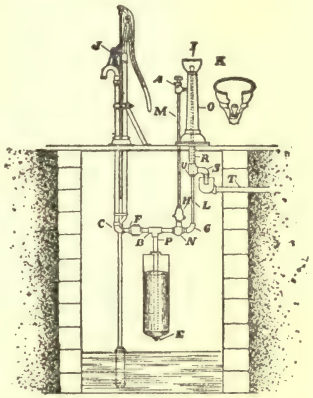
take place. It must be remembered that pollution may result from surface water; therefore the well should be so constructed that surface water cannot enter. To prevent all foreign matter from getting in, a tight cover should be placed over the well. Pollution may also take place from soil —water percolating through the soil from a source of contamination several hundred feet away. This will take place when the rock strata slope from the source of contamination toward the well, and it must be borne in mind that the surface of the land and the underlying rock strata are often not parallel and many times are found sloping in opposite directions.

Water collected from the roof of the buildings and stored in cisterns is used at many schools. Where this water is used, some arrangements should be provided so that the first water coming from the roof at the beginning of each storm will not enter the cistern. After an interval of several days without rain, the roof is always covered with more or less dust; it is also usually soiled from the droppings of birds.

Whatever the source may be, a supply of pure, cool drinking water should be kept where it can be easily reached by the children at all times. The common drinking-cup should not be used. If the water is kept in a pail, a cover should be provided, also a dipper with a long handle for transferring the water from the pail to the drinking-cup. Much more satisfactory, however, is a water-tank with a faucet near the bottom so that the water may be drawn out without the use of the dipper. Such tanks are inexpensive. The double tanks, with an air space between the two walls, keep the heat out of the water for a much longer period than the others, but are of course more expensive. Several tanks are on the market with an attachment for drinking similar to the bubbling fountain.

By use of the pneumatic pressure-tank running water may be had for the country school at a very much lower cost than is usually supposed. A metal tank, the size of the ordi-

nary kitchen hot-water tank or larger, is buried in the ground below the frost line to act as a reservoir and pressure-tank combined. It is connected with a force-pump at the well and with the drinking-fountain in the schoolroom. Both pipes to the tank must be connected at the lowest part of the tank. Water is pumped into the tank from the well by the force-pump. The tank is already full of air, which, as more and more water is forced in, becomes compressed, forming a pressure on the surface of the water and increasing until it is no longer possible to force in more water. This pressure will force the water through the supply pipes up to the drinking-fountain. This form of water-tank is much more satisfactory than an elevated tank inside or on top of the building. There is always sufficient "boy power" around the country school to get the tank filled with pressure great enough to supply the building with running water. Under ordinary conditions five minutes' pumping a day will furnish plenty of water for drinking purposes, and ten minutes' if a water-flush closet is used.



SANITARY DRINKING-FOUNTAIN, RUNNING WATER IN WASH-BOWLS AND FLUSH-TOILETS BY MEANS OF AN ORDINARY FORCE-PUMP

From Dresslar's "Rural Schoolhouses and Grounds." Courtesy Bureau of Education

Such tanks become occasionally "water-logged," that is, the air becomes dissolved in the water and carried away until not enough is left to furnish the required pressure. Therefore it is necessary to have some means of pumping in air, either with the water or by a hand air-pump.

The pneumatic pressure-tank, pump, piping, and drinking-fountain can be purchased for from $100 to $250. With it not only may the sanitary drinking-fountain be provided but

also a convenient sink for washing hands, and sanitary indoor closets instead of the ordinary outhouses.

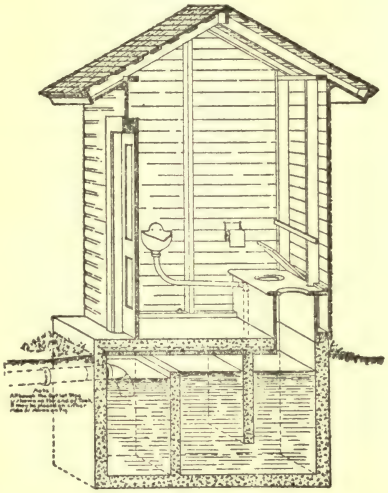
Toilets.—The most difficult problem, and the one concerning which comparatively little has been done, is that of supplying sanitary closets. At thousands of country schools in the United States to-day, no closets of any kind are provided and children must resort to the shelter of neighboring woods. In thousands of others closets are provided but they are so filthy that the children prefer the woods.

The great majority of one-teacher country schools will probably continue to use the outhouse privy for several years to come, and when properly constructed and cared for it may be satisfactory.

The sanitary privy should be so constructed that its use will not be disagreeable to the user, and so that the excreta will be protected from any agencies which might disseminate disease-germs from them, such as the rain, hogs, insects, etc. The closet itself should be made tight, with a close-fitting door, a small window for light, preferably over the door, and an opening near the top for ventilation. In States where snow and severe cold are uncommon, one opening covered with a wire insect-netting is sufficient. In the closet should be placed a permanent box in which a supply of earth or lime should be kept, to be used every time the closet is used. The inside walls should be painted, and sprinkled with sand while the paint is yet fresh, so that a rough surface will be formed on which pupils and others cannot write with pencils. The receptacle should be made tight, with hinged covers, so that as little odor as possible may enter the closet.

Probably the best form of the receptacle for all States where severe freezing does not take place consists of a tight box the floor of which is a continuation of the floor of the closet, and with a hinged door on the rear of the closet opening outward and upward. In this box is placed, under each cover, a galvanized iron or heavy tin bucket or tub to hold the excreta. These buckets should be taken out once or twice

a week and the contents buried in a place where they cannot contaminate the water supply of the school or neighboring farms. The receptacle should have a small opening for the escape of odors, but this should be covered with a netting to prevent the entrance of flies or other insects. In colder countries where freezing would make this arrangement impracticable, a water-tight cesspool should be built for a receptacle, except where the soil is of such a character as to furnish a natural underdrainage, and where to do so admits no danger of pollution of water used for household purposes or for farm stock. In such a case an excavation or pit may be made under the closet, deep enough so that the excreta cannot be washed out. Whether the cesspool or excavation is used, both must be covered tightly so that rain, water, and animals, particularly insects, are prevented from entering.



KENTUCKY SANITARY PRIVY. VERTICAL SECTION OF TANK AND HOUSE

From Dresslar's "Rural Schoolhouses and Grounds"

After each time the privy is used, earth, ashes, or lime should be thrown into the receptacle to cover the excreta. The earth used should be of rather a loamy nature, if possible, and porous. Sandy soil is of little value. A heap of earth should be collected in summer and dried in the sun for winter use. Lime is much better than earth. Where the cesspool or buckets are used, a few inches of water may be kept in the receptacle; this aids the excreta in fermenting and liquefying. When this is done, a half-pint of kerosene oil should

be kept on the surface of the water to repel insects. A five-per-cent solution of crude carbolic acid or a solution of creosol may be used.

In warm climates the closets should be placed some distance from the schools. Separate buildings should be provided for boys and girls and the entrances should be screened to insure privacy. In some cases the closets must be placed in the same building. When this is necessary, a double partition should separate the boys from the girls and a board fence at least six feet high and extending from the building at least twenty feet should separate the entrances. In northern States closets are often placed in an addition to the school building which contains also the coal or wood supply. When the fuel-room is between the schoolroom and the closets this plan is satisfactory, provided proper care is used in the closets. The closets may be entered either from the outside or directly from the schoolroom.

The boys' closet, wherever located, should be provided with a urinal as well as seats. This in its simplest form is a trough constructed across one end of the outhouse with sufficient slope to carry the water away rapidly either to the soil or into the cesspool. The trough should be made of metal, cement, or wood lined with copper or galvanized iron.

In certain sections a chemical closet is being used which is reported as giving satisfaction. This consists of an all-metal box with a door on the front, and a seat with a cover fitting air-tight on top. If the closet is used in a room inside the school building, a three-inch pipe connects the top of the box with a chimney. The suction in the chimney creates a draft through the box which removes from it all gases and odors. A metal receptacle is placed inside of the box to hold the excreta. In this is placed two to six inches of water in which are dissolved certain chemicals that destroy all germs of diseases in the excreta.

The most satisfactory of all closets is the sanitary flush closet. This is easily possible in many country schools, even

in one-room schools. A supply of water with the necessary pressure may be obtained from an overhead tank filled by a common force-pump, or from the pneumatic tank previously described.

Sewage Disposal.—The great difficulty with the use of the water-flush closet is the disposal of the sewage. The most satisfactory, inexpensive way is by use of the septic tank and a subsurface system of distribution of the water. In its simplest form this is an underground tank to which the liquids from the closets are brought and in which they are retained for from twelve to twenty-four hours and then rapidly discharged into open jointed tiles from which they leak out into the soil to disappear. The discharge from the tank is regulated by a siphon. This intermittent flow from the tank into the soil allows the air to enter the soil while the tank is filling and oxidize the organic matter contained in the sewage, converting it into harmless mineral forms suitable for plant-food.

A better form of tank is the double tank, with the first chamber to retain the solid matter and scum until they dissolve, and the second chamber to accumulate the liquids and discharge them intermittently by means of a siphon. The solids dissolve rapidly and but little settlings remain in the first tank. The pipe connecting the first tank with the second tank is arranged so that the first tank is always filled to a certain depth with liquids and so that the liquids taken out are taken from midway between the surface and bottom. Then neither the scum nor settlings are disturbed.

Satisfactory tanks may be constructed of cement by any farmer or carpenter at a cost varying from $25 to $50. Several patented septic tanks are on the market and may be purchased at a reasonable cost.

Conclusion.—Improved rural school sanitation is imperative, not only for the sake of the children who are compelled by law to attend the schools for several of the most plastic years of their lives, but because of the direct and indirect

effects on rural hygiene in general. Progress in sanitation and preventive medicine has quite largely passed by the rural portions of our country, and the public school is the chief instrument for catching up with the times. Through Federal dissemination of information, through State aid in money and expert guidance, and through teachers and county superintendents better educated in rural hygiene, we may expect speedy readjustments.

The following statement of minimum sanitary essentials for rural schools is authoritative and very important:

MINIMUM SANITARY REQUIREMENTS FOR RURAL SCHOOLS[1]

It is the desire and purpose of this committee to help establish a standard of fundamental health essentials in the rural school and its material equipment, so that attainment of this minimum standard may be demanded by educational authorities and by public opinion of every rural school throughout the country.

Possession of the minimum sanitary requirements should be absolutely necessary to the pride and self-respect of the community, and to the sanction and approval of county, State, and other supervising and interested official or social agencies.

Neglect of anything essential for health in construction, equipment, and care of the rural school plant is at least an educational sin of omission and may reasonably be considered a social and civic crime or misdemeanor.

The country school should be as sanitary and wholesome in all essential particulars as the best home in the community. Further, it should be pleasing and attractive in appearance, in furnishings, and in surroundings, so that the community as a whole may be proud of it; so that the pupils and teacher may take pleasure in attending school and in caring for and improving it.

[1] Proposed by the Joint Committees on Health Problems in Education of the National Council of the National Education Association and of the American Medical Association. Pamphlet published by the American Medical Association, Chicago. See also Dresslar's bulletin (U. S. Bureau of Education) on "Rural Schoolhouses and Grounds" and Rapeer's "Standardization of the Rural School Plant" in *School and Society* for Feb. 15, 1915, and his survey of "Rural School Hygiene" in the Pennsylvania "Rural School Report" to the State Educational Association, 1914.

I. Location and Surroundings

The school should be located in as healthful a place as exists in the community.

Noise and all other objectionable factors should be eliminated from the immediate environment of the rural school.

Accessibility.—Not more than two miles from the most distant home, if the children walk. Not more than six miles from most distant home, if school wagons are provided.

Drainage.—School ground must be well drained and as dry as possible. If natural drainage is not adequate, artificial subsoil drainage should be provided.

Soil.—As every rural school ground should have trees, shrubs, and a real garden or experimental farm, the soil of the school grounds should be fertile and tillable. Rock and clay soil should always be avoided. If the soil is muddy when wet, a good layer of sand and fine gravel should be used to make the children's playground as useful as possible in all kinds of weather.

Size of School Grounds.—For the schoolhouse and playground at least three acres are required.[1]

Playground is not a luxury but a necessity. A school without a playground is an educational deformity and presents a gross injustice to childhood.

Arrangement of Grounds.—The school grounds should have trees, plants, and shrubs grouped with artistic effect but without interfering with the children's playground.

II. Schoolhouse

The schoolhouse should be made as nearly fire-proof as possible. Doors should always open outward and the main door should have a covered entrance; a separate fuel-room should be provided, also separate cloak-rooms for boys and for girls.

A basement or cellar, if provided, should be well ventilated and absolutely dry.

The one-teacher country school should contain, in addition to the classroom:

(*a*) A small entrance-hall, not less than 6 by 8 feet.

(*b*) A small retiring-room, not less than 8 by 10 feet, to be used as an emergency-room in case of illness or accident, for a teacher's

[1] If the rural school plant includes the additional features (a teacher's home, a garden, and an experimental farm), which are already in some progressive States accepted and established as educational essentials, then the school grounds should contain eight to ten acres.

conference-room, for school library, and for health inspection, a feature now being added to the work of the rural school.

(*c*) A small room, not less than 8 by 10 feet, for a workshop, for instruction in cooking, and for the preparation of refreshments when the school is used, as it should be, for social purposes.

Classroom should not be less than 30 feet long, 20 feet wide, and 12 feet high. This will provide space enough for a maximum of thirty pupils.

III. Ventilation and Heating

The schoolroom should always receive fresh air coming directly from out of doors in one of the following arrangements:

(*a*) Through wide-open windows in mild weather.

(*b*) Through window-board ventilators under all other conditions, except when, with furnace or jacketed stove, special and adequate inlets and exits for air are provided.

Heating.—Unless furnace or some other basement system of heating is installed, at least a properly *jacketed stove* is required. (No unjacketed stove should be tolerated in any school.)

The jacketed stove should have a direct fresh-air inlet about 12 inches square, opening through the wall of the schoolhouse into the jacket against the middle or hottest part of the stove.

The exit for foul air should be through an opening at least 16 inches square on the wall near the floor, on the same side of the room as the stove is located.

A fireplace with flue adjoining the stove chimney makes a good exit for bad air.[1]

Temperature.—Every school should have a thermometer, and the temperature in cold weather should be kept between 66 and 68 degrees Fahrenheit.

IV. Lighting

The schoolroom should receive an abundance of light, sufficient for darkest days, with all parts of the room adequately illuminated.

The area of glass in windows should be from one-fifth to one-fourth of the floor area.

The best arrangement, according to present ideas, is to have the light come only from the left side of the pupils and from the long wall of the classroom. Windows may be allowed on rear as well as on the

[1] The following arrangement for ventilating-flue is required in one Western State: A circular sheet-steel smoke-flue, passing up in centre of ventilating shaft (foul-air exit), 20 inches square in the clear.

left side. High windows not less than seven feet from the floor may be permitted on the right side as an aid to cross-ventilation, but not for lighting.

There should be no trees or shrubbery near the schoolhouse which will interfere with the lighting of the classroom.

The school building should so face with reference to the windows that the schoolroom will receive the direct sunlight at some time during the day.

Shades should be provided at tops and bottoms of windows, with the dark shades at top, so that light may be properly controlled on bright days.

Schoolroom Colors.—The best colors for the schoolroom in relation to lighting are:

Ceiling—white and light cream.

Walls—light gray, green.

Blackboards—black.

V. Cleanliness

The schoolhouse and surroundings should be kept as clean as a good housekeeper keeps her home.

(*a*) No dry sweeping or dusting should be allowed.

(*b*) Floors and furniture should be cleaned with damp sweepers and oily cloths.[1]

(*c*) Scrubbing and airing are better than any form of fumigation.

VI. Drinking Water

Drinking water should be available for every pupil at any time of day which does not interfere with the school programme.

Every rural school should have a sanitary drinking-fountain located just inside or outside the schoolhouse entrance.

Drinking water should come from a safe source. Its purity should be certified by an examination by the State board of health or by some other equally reliable authority.

A common drinking-cup is always dangerous and should never be tolerated.

Individual drinking-cups are theoretically, and in some conditions, all right, but practical experience has proven that in schools individual cups, to be used more than once, are unsatisfactory and unhygienic. Therefore they are not to be advocated nor approved for any school.

[1] Sweeping compounds in moisture-proof containers may be obtained in the market.

Sufficient pressure for running water for drinking-fountain or other uses in the rural school may always be provided from any source without excessive expense by a storage-tank or by pressure-tank with force-pump.

VII. Water for Washing

Children in all schools should have facilities for washing hands available at least:

(*a*) Always after the use of the toilet.

(*b*) Always before eating.

(*c*) Frequently after playing outdoors, writing on blackboard or doing other forms of hand-work connected with the school.

Individual clean towels should always be used.

Paper towels are the cheapest and most practicable.

The common towel is as dangerous to health as the common drinking-cup.

VIII. Furniture

School seats and desks should be hygienic in type and adjusted to the size and needs of growing children. Seats and desks should be individual—separate—adjustable—clean.

Books and other materials of instruction should not only be sanitary but attractive enough to stimulate a wholesome response from the pupils.

IX. Toilets and Privies

Toilets and privies should be sanitary in location, construction, and in maintenance.

(*a*) If water-carriage system for sewage is available, separate toilets for boys and girls should be located in the schoolhouse, with separate entrances on different sides or corners of the school building.

(*b*) If there is no water-carriage system, separate privies should be located at least fifty feet in the different directions from the schoolhouse, with the entrances well screened.

(*c*) The privy should be rainproof, well ventilated, and one of the following types:

(1) Dry earth closet.

(2) Septic-tank container.

(3) With a water-tight vault or box.

All containers of excreta should be water-tight, thoroughly screened against insects, and easily emptied and cleaned at frequent intervals.

No cesspool should be used unless it is water-tight and easily emptied and cleaned.

All excreta should be either burned, buried, treated by subsoil drainage, reduced by septic-tank treatment, or properly distributed on tilled land as fertilizer.

X. All Schoolhouses and Privies Should be Thoroughly and Effectively Screened against Flies and Mosquitoes

XI. Schoolhouses and Outhouses Should be Absolutely Free from All Defacing and Obscene Marks

XII. Buildings Should be Kept in Good Repair and with Whole Windows

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STANDARDS

Provision and equipment of adequate school plant depends on intelligence, interest, pride, and financial ability of community.

Maintenance of a clean and sanitary school plant depends on efficient housekeeping, and on interest and willing co-operation of pupils.

No community should be satisfied by the minimum requirements indicated in the foregoing, but every country school should be so attractive and well equipped as to minister with some abundance of satisfaction to the physical, mental, æsthetic, social, and moral well-being of those who provide it, who own it, who use it, and who enjoy it.

Present Conditions

Among the reasons which explain the present deplorable conditions of rural schoolhouses, the following are prominent:

(*a*) Low architectural and sanitary standards in rural regions generally throughout the country.

(*b*) Ignorance regarding the physical, mental, social, and moral effects of unattractive and unsanitary school buildings on the children and on the community as a whole.

(*c*) False economy expressed by local school boards in failure to vote enough money to build and maintain suitable school buildings.

(*d*) Lack of supervision or assistance by the State, which is usually necessary to maintain desirable standards.

Improvement

How shall the rural schools throughout this country be improved up to a reasonably satisfactory standard?

I. By a popular campaign of education regarding the conditions desirable and possible in the country school. Such a campaign would profitably include many or most of the following:

(*a*) The United States Bureau of Education and State departments of education should furnish plans and instructions for construction and equipment of rural school buildings.

The United States Bureau of Education in Washington is already supplying, on request, valuable help of this kind, and a few State departments of education are demonstrating what may be done by supervision and support which aids without controlling.

(*b*) State departments of education should supply supervision of rural schools and should have power:

(1) To condemn insanitary and wholly unsuitable buildings.

(2) To give State aid to rural schools when the local authorities fulfil certain desirable and reasonable conditions.

(*c*) Ideas and standards of school sanitation should be inculcated in minds of local school patrons and school authorities who control school funds and who administer the affairs of the schools. Public lectures on health topics should be provided in the schoolhouse and elsewhere.

(*d*) Effective school health courses should be introduced in normal schools and teachers' institutes.

Better education of rural school-teachers, county superintendents, and rural school supervisors in the principles and practise of school hygiene and sanitation should be assured.

(*e*) Interest in and enthusiasm for the improvement and care of all features of the school and its surroundings which affect health and happiness should be inspired in the minds of rural school pupils.

Organizations such as "Pupils' Board of Health," "Civic Leagues," or "Health Militias" may profitably be formed among pupils.

(*f*) Organizations like "The Granges," Women's Clubs, County Medical Societies, and other groups so situated that they may further the cause of health and efficiency, should co-operate with the rural school.

(*g*) Attractive but reliable health information should be furnished abundantly by the public press.

II. Emulation and competition should be recognized and rewarded in ways that will promote wholesomely and progressively the welfare of the community as a whole.

TEN SANITARY COMMANDMENTS FOR RURAL SCHOOLS

In every school which may be considered passably sanitary the following conditions shall obtain:

1. Heating by at least a properly jacketed stove. (No unjacketed stove to be allowed.)

Ventilation by direct outdoor-air inlets and by adequate and direct foul-air outlets.

2. Lighting from left side of room (or from left and rear) through window space at least one-fifth of floor space in area.

3. Cleanliness of school as good as in the home of a careful housekeeper.

4. Furniture sanitary in kind, and easily and frequently cleaned. Seats and desks adjustable and hygienic in type.

5. Drinking water from a pure source provided by a sanitary drinking-fountain.

6. Facilities for washing hands, and individual towels.

7. Toilets and privies sanitary in type and in care (with no cesspools unless water-tight) and no neglected privy boxes or vaults.

8. Flies and mosquitoes excluded by thorough screening of schoolhouse and toilets.

9. Obscene and defacing marks absolutely absent from schoolhouse and privies.

10. Playground of adequate size for every rural school.

CHAPTER XVI

HYGIENIC SCHOOL ENVIRONMENT

The Problem.—The public-school system must be satisfied with nothing less than the ideal, not only in methods of teaching and the results these methods accomplish but also in the surroundings the school gives the pupils while they are in its care. The public school should be a leader not only in the matters of mere learning but also in giving lessons, by example, on how to live with the end in view of securing the proper sanitary surroundings in the homes and business world. The public of every school community has a right to demand that only the best principles and the highest ideals should emanate from the school, with respect to cultivating the mind, methods of living, and habits of life. Childhood is the impressionable time. What is woven into the mind and heart and nervous system in youth is likely to persist to the end. If a child grows up in unclean surroundings, his life will probably show throughout something of the influences of his youth. Insufficient clothing, bad food, poor light, foul air—all these cast their blight over children. Some one has said that the race advances on the feet of little children. If the children of our present day can have better conditions under which to develop than did the children of the generation just past, then the race has made a distinct advance. If better habits can be developed in children that now attend our schools, then the race has so far gained over what it received from the schools of the past.

The responsibility of those who administer our schools is a tremendous one; the call to higher and better things is an insistent one. What any new day may bring forth can be, of course, only problematical, but all things point to that better time when every child in our schools will not only be well taught but will have about him every life-giving and healthful condition: when he will have God-given fresh air to breathe and not the baked air that devitalizes; when he will have pure water to drink and not the germ-laden fluid from well and stream and pool that often carries disease and death; when the great and beautiful light of God's out-of-doors will have unhindered access to every schoolroom in place of the half-lights and shades that dim the eye and worry the nervous system; when every child shall have playground space enough to exercise all his body powers; when every teacher and school administrator shall know accurately what school conditions ought to be, and shall leave no stone unturned until those conditions are obtained; when the world shall demand that every school be a perfect place for children and that there they may attain to the fullest development of their mental and physical powers. This problem of better sanitary conditions in our schools is one that must be soon solved. We are at the dawn of a better day as to the care of our children, and there can be no work that is more important.

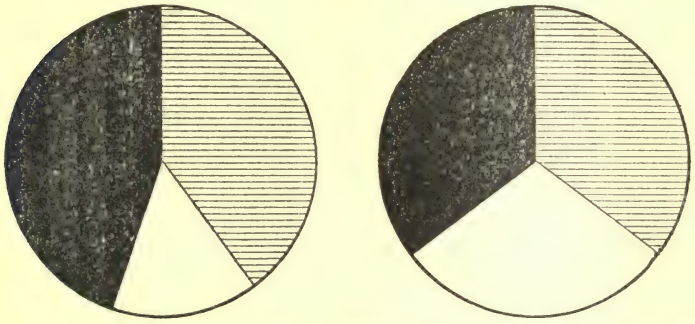
Some Sanitary Conditions.—This problem of getting the best sanitary conditions in and about the schoolroom is not merely a school problem; it is quite clearly a community problem as well. The school will not for any considerable length of time be very much better or very much worse than the people want it to be, either as to the physical condition of the building or the quality of the teaching that is done in the building. These statements are especially applicable to the United States, where every enterprise rests directly or indirectly on public opinion, public sentiment, and the will of the people. Any nation-wide survey of American schools will lead to the conclusion that there are thousands and thou-

sands of school communities that need to wake up and then to catch up with the best thought of the time on how to take care of the children that must attend the schools. The responsibility for bad conditions is seen to be especially heavy when it is realized that in most of the States there are compulsory-education laws and that children must be submitted to the conditions of the schoolroom, be those conditions good or bad. In a multitude of communities children are forced into schools where poor light, air that is continually foul, and contaminated water endanger the health and sow the seeds of disease and death. It is a hard thing to be compelled to say, but there are many communities where the school surroundings are so bad that the children would be far better off out of school than in. Practically every school survey reveals this fact. There is a tremendous need of the gospel of school hygiene. Every person that preaches it is indeed a missionary. This gospel needs to go into many dark places, for there are hundreds of schools in which those in authority violate every known law of the proper housing and physical care of children.

There are schools that are on low, small, and poorly drained sites. Especially is this true in many country districts where the schools were placed on land that was not good for anything else in particular. There are numerous schools whose architecture is that of a barn, whose ventilation is unscientific, inefficient, and continually harmful, and whose lighting systems had no further planning than the leaving of a few square holes in the walls and filling them with windows. It is hard to refrain from making seemingly hysterical and overcolored statements when one discusses actual conditions in a multitude of American schoolrooms. There are rooms into which the light is admitted from all four directions, others into which the light comes from three directions, and an uncounted number that receive light from two opposite sides.

The unjacketed stove of our fathers is still doing duty in

schoolrooms everywhere, and many an urchin is being baked on one side and chilled on the other while he seeks to follow the devious ways of knowledge. Even in many instances where more elaborate systems of heating have been installed, the most deplorable results are obtained. Foul air-ducts do not do their work properly, rooms are overheated, and the air is baked till it becomes dryer than the atmosphere in the



RATIO OF WINDOW SPACE TO FLOOR SPACE IN OHIO RURAL SCHOOLS
From Ohio School Survey

most arid regions of the earth. Colds, coughs, and kindred troubles come, children are carried off by death, and the ignorant school community sighs and wonders at the ways of a mysterious Providence that sees fit to strike down the fairest flowers in this garden of earth. If such communities would abandon attributing to Providence the results of their own ignorance and laziness, and arouse themselves from their lethargy and indifference, their children would have a better chance to live out the lives that Providence has offered them.

Pure Drinking Water.—Along with the matters of ventilating, lighting, and heating comes the question of obtaining a proper supply of drinking water. The best way to provide water is by means of drinking-fountains, but sometimes

the water so provided is of poor quality because of the location of the school or the community in which the school is located. The best that can be done is the thing to do, of course, but there is little or no excuse for the criminal negligence and ignorance that prevail in some schools. In all too many cases, in rural communities, water is carried from neighboring farms and is allowed to stand all day exposed to the foul air and the dust of the schoolroom. No more is brought till the supply in the bucket is exhausted, or till it gets so bad or so warm that it is necessary to go for more. In some cases the water-supply is obtained from springs or shallow wells that catch the drainage and possible contamination from the surrounding ground. Where such conditions prevail the cause is usually found in the fact that those responsible are either too ignorant or too niggardly to provide the proper kind of a well on the school premises. There is nothing in the world so sacred as the taxpayer's dollar, not even the lives of little children, in the view of many men who administer the financial ends of school organizations. Every human being must have plenty of pure, fresh water every day if he is to keep in health. The State has undertaken to gather children together in groups and to educate them. The State commits a crime when it does not safeguard the health and lives of these little ones on whom the future depends. The foolish, the careless, the ignorant, and the indifferent ought never to be intrusted with the care of the children in our schools.

Many additional details might be given to show that many conditions in our schools the country over are far from satisfactory from a hygienic standpoint. It is safe to say that very few school-buildings even approximate ideal conditions. The surface has barely been touched in what has been written above. There are many schoolrooms that are looked after by teachers and janitors who have never even heard of some of the modern appliances for the proper care of school buildings. For the sake of reminding the reader in regard to the

conditions, methods, and appliances that ought to be in use in every ideally equipped and managed school, a list of subheads given by the editor of this volume under the general topic of "School Sanitation" is submitted herewith: sites, architecture, ventilation, lighting, heating, drinking-water, drinking-fountains, cleaning and vacuum cleaners, school baths, hygienic toilet facilities, seats and desks, decoration, fire-proof construction, rest and emergency rooms, play-rooms and roof playgrounds, open-window rooms, supervision of janitors, hygienic cloak-rooms, drying and warming seats, investigations of recirculation, humidity, air-cleaning, disinfection, etc. This is rather a formidable list, is it not? One can readily surmise that to understand and to apply the things suggested takes something more than the mere qualification of being elected to a school office or of being able to pass a teacher's examination in the three R's with accessories. The proper hygienic administration of a modern school is a big problem. The general schoolroom conditions that prevail in this country are far from satisfactory—every survey shows that. The State cannot fairly and honestly force children to attend school and then not properly care for their health. There is splendid public-health work ahead for the schoolmaster and the schoolmistress of the present time.

Sanitary Surveys.—The enthusiastic inquirer into what ought to be done under the circumstances can be given plenty of things to do. The first thing that ought to be on the programme of school betterment from a sanitary standpoint, in every State, is the matter of a proper sanitary survey. If every schoolhouse in the nation could be visited by one or more experts and its physical surroundings made note of, if all the data in regard to every schoolhouse could be set down on standard forms in use by all other experts so that there could be no confusion in regard to the results of individual surveys, then a big start would be made toward getting better conditions. If, for instance, it could be known for any given school year just how many schoolhouses in this coun-

try are improperly heated, lighted, and ventilated, how many have poor water-supplies, how many owe their poor condition to backward and ignorant school communities, etc., every thinking person would derive a tremendous inspiration and help in this fight for better things. There is no stimulant like scientifically determined standards and exact knowledge. A thorough national survey of our schools would let all the world know just what are the conditions in every individual school. With the knowledge of poor conditions in any given school district would come ridicule, then shame, then determination to have better things. Community pride would be appealed to, and straightway the children in that community would have a better chance to enjoy life and health and, withal, to get a better education because of better, healthier bodies with which to get that education. It will probably be many years before there will be a general, simultaneous, national school survey, but it ought nevertheless to be made. There is no reason why the more progressive States, like Ohio, cannot take up this work.[1] The results would be invaluable not only in a direct way to the schools themselves but to the State at large in the way of educating the people. There is an almost immeasurable opportunity here for some State to take the lead in this direction.

Occasionally a school survey is undertaken by sending out blanks for teachers or others to fill out. This method is good so far as it goes, but it has many faults. With the present attitude of the public toward such movements, however, it is about the only method that is attainable at this time. Those who administer public funds have not yet come to the place where they will permit a body of experts sufficient remuneration for travelling about over the country and finding out things that only experts can find out. Even if every questionnaire blank sent out in any given survey were answered in full, much of the information obtained thereby would be inaccurate and unreliable. How many teachers

[1] See recent survey reports for Ohio, Pennsylvania, and Illinois.

or school officers, even with stated standards, are proper judges of ventilation, lighting, heating, the quality of drinking water, the proper colors to put on the walls and ceilings of schoolrooms, hygienic cloak-rooms, humidity, disinfection, and kindred topics that have to do with the proper care of children? Even where, for instance, the ratio of window space to floor space is the correct one and the teacher knows that ratio or standard to be correct, there may actually be an insufficient amount of light coming into the schoolroom. Neighboring trees or buildings or other obstructions may shut out light. These interfering and complicating features may easily be lost sight of by the inexpert. A report may show that a building is thoroughly equipped with a plenum system of heating and ventilating and yet some part of that system may be working in a manner that is far from satisfactory. Drinking water may be obtained from a source that ordinarily would be safe enough, and kept in sanitary drinking-fountain tanks, and yet that water may be daily endangering the lives of those who drink it. The questionnaire method, while it is the best that can be used under most circumstances, has, then, its apparent dangers of misinformation and unreliability. The best method is to send the expert in person to inspect and report. A mass of information gathered in this way will then form a reliable basis on which to base conclusions.

The average school executive, however, will ask what he can or ought to do under the existing circumstances, and not what he might do with plenty of money and an abundance of expert assistance. The first thing for any school executive to do, no matter whether he be superintendent, principal, teacher, or other person in authority, is to begin with what he has in hand in the way of equipment. He can first inform himself as to needed standards and requirements, and then by investigation and experiment find out whether the pupils under his care are working and living under satisfactory conditions. He can measure the window space in

each room and find out whether, according to the best standards, sufficient light is being admitted. He can measure the cubic contents of each room and ascertain whether each pupil has enough air space. He can measure the air currents that enter and leave each room in a plenum system and find out whether each pupil is receiving enough air per minute. He can test the drinking water or send it to a State chemist or other chemists for investigation. He can cultivate his judgment by the use of his common sense and scientific standards as to whether the colors on the schoolroom walls are what they ought to be. By experiment and standard instruments he can determine whether the humidity of his schoolrooms is what it should be. He can inspect closely the work of janitors and see whether they get reasonably satisfactory results. He can, after a little reading and other investigation, determine whether a thorough, workable, and constantly used system of disinfection should be installed. In short, after some study of his sanitary situation, he can give a tolerably accurate account of it and what it needs. This kind of a sanitary survey is likely to bring the best results because of its having been done by the person who, more than any one else, is responsible for it and for its being remedied. Expert sanitary surveys made at large have the advantage of being well done, but the survey made by the person that must remedy conditions found to be bad is ordinarily of the most use, because it is more likely to result in efficient and forcible action. The school official who is anxious to make a sanitary survey and to get health results therefrom need not lack for information as to what to do. The health officers of his community and the constantly growing body of literature on the subject of public-school health will thoroughly inform him, if he is anxious to be informed. One of the greatest services that any school official can perform for his community is to make or have made a complete sanitary survey of the school property under his care.[1]

[1] For cities, the sanitary inspection forms used by the Philadelphia schools will prove suggestive.

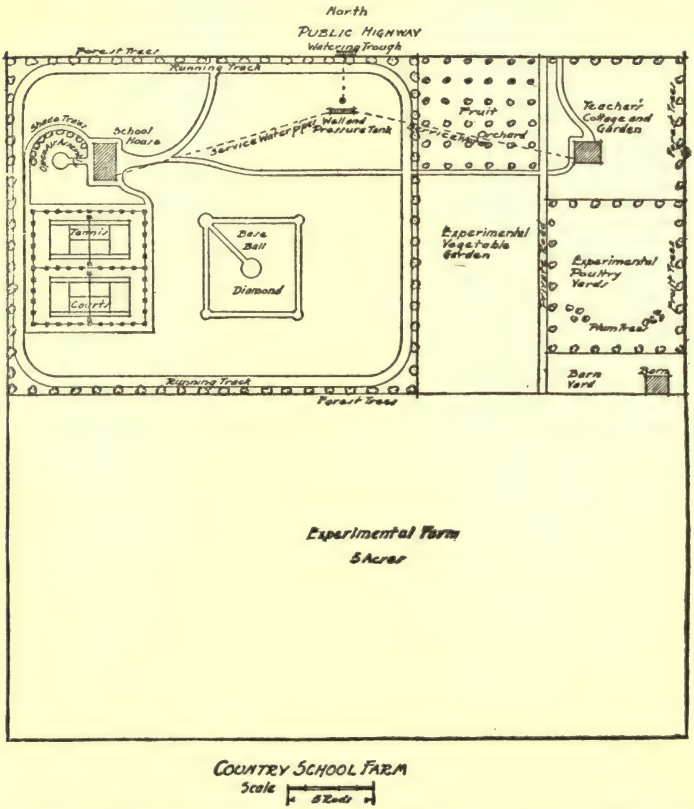
The Health Officer and the School.—The local health officer, following the rounds of his ordinary duties in looking after the public health, can do no greater service than that of constantly agitating the matter of better sanitary conditions in the schools. Agitation ought to be the first thing on his programme, and then he ought to see to it that all the teachers and school officers who come under his jurisdiction are thoroughly informed as to reasonable sanitary standards and know just what to do under all ordinary circumstances. School officials may want to have sanitary matters just right and yet may not know just how to obtain their ends. Energetic and well-informed health officers can step in at this juncture and be of inestimable service to the schools. Such officers can furnish definite and clear rules for the construction and sanitary maintenance of schoolhouses. They can interpret and apply school-health legislation. Through the legal powers given them they can usually close up schoolrooms that are endangering the health of children and that will never be improved except through some such vigorous compulsion. Especially can State boards of health, when given enough support by law, serve their States in a great and vigorous way. This is markedly true in cases where the executive officers of such boards are men of unusual vigor, enthusiasm, and devotion to the cause in which they are enlisted.

The particular thing that any health officer or board can do, with the assurance of rendering an immediate service, is the dissemination of information as to sanitary matters, in language that is clear, definite, and untechnical. Further than this, if such information, when scientific, can be enacted into law or if the decisions of health boards can have the weight of law, the communities affected will have a still greater service rendered them. Perhaps one of the most striking instances of a State board of health that is serving the schools of its State in this definite way is furnished by the health board of a middle-Western State (Indiana). Legal enactments and judicial decisions have given to the actions of this board the weight

of law. This board has a great advantage in this direction. It demands right conditions. School people throughout the State must obey its behests. The problem before the board, then, is extremely simple—put into clear and direct language a set of rules, based on the best modern standards, to govern the construction and care of all school-buildings. Since these rules have the weight of law, they must be obeyed. Such a set of rules has in this State recently been formulated. These rules cover everything from the minimum number of square feet per pupil on the playground to the reheating of air under certain conditions. Any intelligent person can understand these rules. They operate for all. The first and the permanent effect has been the lifting of sanitary operations in all schools to a much higher level. Fortunate is the school system of any State that can have such uniform and thorough administration as to health matters. Where they are under the supervision of the State boards, and where these State boards have definite and clear-headed policies as to what ought to be done, the local boards of health can, of course, attack their problems with more vigor. And where there are in the State department of *education* efficient departments of hygiene, the same results or better can be obtained.

Sites.—All school sites should be easy of approach, somewhat elevated, and thoroughly drained. Water should never stand on a school yard. A schoolhouse should not be near any condition or situation that might impair the work or the health of the children. No school should be near any industry that pollutes the atmosphere, or near any stagnant water or other objectionable situation. Every school should have a playground of not less than one acre. Especially is this true in the country, where land is comparatively cheap. In addition to the playground, there should be room for school gardening, and for other activities that have to do with health and the implanting of correct ideals as to what beautiful school grounds ought to be. Where there is a consolidated school, ten to twenty acres for a school farm should be

added. The playground part of the school site should contain an area of not less than thirty square feet for each pupil. The grounds should really be much larger than this standard. In the opinion of the writer, healthful out-of-doors play is far



(From Dresslar's "Rural Schoolhouses and Grounds." Courtesy U. S. Bureau of Education.)

to be preferred to any and all systems of calisthenics in school or other rooms. The child that has the room to run and play as he desires has a big help in the matter of having good health. If his playground is well drained and gravelled, free from depressions in which water can stand, and equipped

with enough apparatus to afford proper exercise for him, he is fortunate indeed; for his school will probably be more attractive to him and his tendency to be out of, or late in arriving at, school will be reduced to a minimum. One of the greatest assets in maintaining the health of any set of schoolchildren is to have a school site that is big, healthful, and serviceable enough to make it possible for children to get the most out of life. "Excessive housing" has been called one of the dangers of modern civilization. It is the duty of the school to combat this tendency by having school grounds big enough to serve to the fullest the needs of all the children.[1]

Standards of Construction.—The construction of school buildings is an extensive topic. It includes all the details of planning and arrangement, the specification of materials, and construction according to the latest and most approved ideas as to sanitation. However, some general rules can be laid down that should apply to the construction of almost every schoolhouse. Local conditions may possibly produce variations from these standard rules, but in the main they probably should prevail. The *first* of these suggestions is that no school building should be more than two stories in height, above the basement. The objection will at once be made that in cities, where the price of real estate is largely beyond the reach of school funds and where the number of children to be taken care of is large, it is absolutely necessary to build schoolhouses more than two stories in height. The necessity may in certain atypical cases seem to exist, but there are some people who claim that the health and lives of children are more precious than real estate, and that every school should have room enough in which to take care of every child in the way it ought to be taken care of. Children more than two stories from the ground, with the best of modern fireproofing of buildings, are running serious dangers from fire, and they probably undergo undue strain in constantly climbing two or more flights of stairs. The *second* general rule in

[1] See Chapter XXIV.

construction is that all school-buildings shall be constructed so as to be absolutely fire-proof or as nearly so as is possible. All exits should be as wide as possible, and all interior wood finish should be as small in amount as possible. Furthermore, all wood finish and all plastering should be so constructed as to minimize or prevent the collection of dust. Every window-sash ought to contain as few panes of glass as possible, and where it seems difficult to light rooms properly prism glass should be used. Especial attention should be paid to the matter of lighting, for mistakes in this direction are often not easily detected and may produce much harm.

Heating and ventilating systems should take fresh air from outside the building, diffuse it throughout each schoolroom, and carry out the foul air at a rate of not less than eighteen hundred cubic feet per hour for each two hundred and twenty-five cubic feet of schoolroom space, in all conditions of the outside atmosphere. Even where stoves are used, apparatus should be installed to take air from outside the schoolhouse and to conduct to the outside the foul air. The health authorities in any community should prevent the use of a school-building that does not approximate in fresh-air efficiency the standard set out above. Automatic temperature regulation should be provided in all buildings with central heating systems. No matter how faithful the teacher or the janitor may be in looking after the heating and ventilation, he cannot be as efficient as the best modern regulating apparatus. The very fact that a teacher is in and inured to the schoolroom often disqualifies him for quickly and accurately judging whether the room is too warm or too cold, and whether fresh air is needed. The usual temperature formerly recommended for the schoolroom was seventy degrees, and the ordinary regulation apparatus is set for that figure, but children may have as good or better health at a lower temperature, especially if there is a proper degree of humidity in the schoolroom. The usual heating apparatus should provide easily a temperature ranging from sixty-six to

sixty-eight degrees. In summary, the proper amounts of heat, light, and fresh air are the first things to be taken into consideration in the erection of any building.

Another feature that must be looked after carefully is the proper installation of toilet and wash-room facilities. Cleaning the building should also be made as easy as possible. Vacuum sweepers and every other modern appliance ought to be put in the trained hands of the janitors. Wherever possible, inclines should be substituted for stairways, since inclines permit each person ascending them to take such steps as suit him; there is consequently less physical strain; and the inclines are in many ways more serviceable than the stairs. All dry dusting and sweeping must in every school be strictly prohibited. In fact, the one thought of every architect, builder, and administrator of every school-building ought to be that the children are to be looked after first, last, and always. Their health and their general welfare are to be considered at all times, and everything that is done should point principally toward that end. No building is ever erected merely for the purpose of giving any teacher, janitor, or other person a position on the public pay-roll. And, although these persons should also be given the best possible hygienic conditions, "Service to Children" should be the motto whenever and wherever a public school is built and maintained.

The Janitor.—There is one very important factor in the care of every schoolhouse and that is the character of the work of the janitor. It is useless to talk of school hygiene and to construct sanitary buildings unless these buildings are to be cared for in the correct way. The importance of the janitor's work is often underestimated, and that person himself is all too often not given a fair chance either to know what to do or to have the tools with which to do his work as it should be done. Some one has suggested that since it is thought necessary in these days of classes in domestic economy to train homekeepers who have charge of the health of individual families, it might also be well to train the men and

women who take care of school-buildings, many of which contain hundreds of people where the home usually contains but a few individuals. The fact of the matter is that most campaigns for better sanitary school conditions begin at the wrong place. The first thing to do, in many instances, is to see that the man, woman, or boy who daily cleans the schoolroom and cares for the rest of the schoolhouse understands his problem, knows why it is harmful to do dry sweeping, appreciates the necessity for having plenty of fresh air coming into the room all the time, and realizes in a general way how important his work is. Further, teachers, principals, and superintendent ought to understand the work of the janitor. In many cases, if there were a fuller understanding there would be more sympathy and, consequently, better work. Further, school officials should see to it that the janitor has all the necessary appliances and arrangements with which to do his work. If school health is the first consideration, then the means of securing and maintaining that health should always be at hand. Cutting down on the amount of the janitor's supplies is a poor way to economize if any effectual sanitary work is to be done. He should have all the appliances that are necessary for him to do his work well.

All are agreed that it is best to have all persons who care for the child's mental development take courses of instruction and pass certain examinations. Why would it not be well to require courses of instruction and examinations for the persons who are to have a very important part in caring for the children's *physical* welfare? Will it be possible to secure the best results in school sanitation before some such instruction and tests are required of all janitors? In all too many cases the janitor owes his position to the fact that he belongs to some political faction or that he has some influence other than fitness for the work he is appointed to do. No other consideration than ability and faithfulness should enter into the process of employing and retaining a janitor.

Further, a good work can be done by any school execu-

tive if he will get his janitors together occasionally and discuss with them the various matters that have to do with the proper care of school buildings. For instance, the subject of the proper lighting of schoolrooms could be explained at a meeting of the janitorial force. Discussions, illustrations, and experiments could be utilized in an effort to get all to understand the great importance and standard requirements of the subject. Other meetings could be called for the consideration of other problems. A feeling of sympathy between the janitors and the school authorities could thus be created that would not otherwise exist. The whole situation would be materially improved in any school system where such a well-planned scheme of bettering sanitary conditions through the janitor is undertaken. The janitor's work is of the greatest importance. He cannot know too much about his work and there cannot be too great an understanding of and sympathy with the magnitude of his tasks and the difficulties that they present.

A General View.—In a broad survey of school conditions in this country there is to be found much that is hopeful in general as well as in the particular phases that have to do with school sanitation. Progress in any one school line must eventually mean progress in all other lines. Generally speaking, the most modern methods of teaching are found in the most modern buildings. The community that wants good teaching generally wants good school-buildings and will get them if possible. In sanitary as well as other matters the dream of to-day will be the actuality of to-morrow, and we shall constantly move on to better things.

Conclusions.—This introductory survey of sanitary conditions in the schools throughout the country leads to certain general conclusions of a practical nature, namely:

Practically everywhere in our country there is the spirit of progress in matters of school sanitation.

There is to-day a very much greater expenditure for sanitary measures and appliances than ever before.

City schools spend proportionately more along sanitary lines than do country schools.

As a rule, city school-buildings excel in matters of heating, lighting, and ventilation, as well as in several other important features. There are many exceptions to this rule, but it nevertheless prevails.

Every school should have plenty of light; plenty of good, pure, unbaked, life-giving air; good water; bathing facilities; roomy playgrounds; in many instances school-prepared noon lunches; and all other things that go to the making and maintaining of health.

Whenever our people get ready to spend as much money on public education and health as on their hogs and cattle, and on some of the unnecessary and harmful things in which they indulge, there will readily come to pass all the things of which we dream.

The schoolhouse should be the model for the community in all sanitary matters. It should be the centre of a radiating gospel of good health.

Finally, the one great opportunity to lay the foundations of a superior public health is to be found in the public schools.

CHAPTER XVII

SCHOOL SANITATION STANDARDS

A Sanitary School Environment.—The problem of furnishing children of a community with a thoroughly hygienic and sanitary environment can be seen, in the light of past chapters, to be one of great difficulty as well as one of supreme importance. Sanitary home and neighborhood conditions are only a part of the problem. When we come to the school maintained by the State with compulsory attendance for all children up to a certain age, we have the problem in an acute form. The State is not only responsible for the health of its involuntary charges, but it is extremely interested in their hygienic welfare. It is, moreover, bound to set as high an ideal of sanitation as possible as an example to the public, which has a right to take it as a standard. The most sanitary home in the country is not too high a standard for the State public school.[1]

Moreover, the problem offers many new difficulties nonexistent in the ordinary home. The average family is from four to six in number, while the average detached house or apartment has about the same number of rooms, an average of about one to a person. At the school, the average is about thirty to forty persons to a room, instead of but one to a room. Moreover, these persons are from many different homes and sources of possible contagion. In the home, free movement about the house is possible; at the school, each pupil leads, for the most part, a sedentary life in a seat usually screwed to a fixed spot in the room. These and many other considerations have led to innumerable grievous sanitary errors on the part of school directors, carpenters, and janitors. Their "apperceptive basis" has been that of home conditions, and this

[1] See Professor Irving King's recent bulletin on "Hygienic Conditions in Iowa Schools," published May 29, 1915, by the University of Iowa, Iowa City, Iowa.

has been mechanically transferred to the construction and sanitation of schools.

Much if not most of the recent interest and development in the field of educational hygiene has been along school-sanitation lines and a number of the recent flood of books indicate this emphasis, one of the best of them devoting about fifteen chapters to school sanitation, seven to medical inspection, two to the hygiene of instruction, one to physical education, and none to the teaching of hygiene. A large part of this interest and development has been brought about by the fortunate competition of school engineers, architects, and supply houses for the large money rewards in this field. The competition of inventive genius and the nation-wide advertising of sanitary drinking-fountains has, for example, been a big factor in this one step of sanitary improvement. Other illustrations are innumerable.

It is manifestly impossible to treat in a few pages or chapters of an average book the details of this rapidly developing science and practise. We must limit our discussion to the barest fundamentals. These fundamentals must and should be of the nature of standards or norms by which to test and to guide effort in this field. But on looking for such standards one must at once be struck with the fact that we are practically without real scientific standards of school sanitation. We have numerous tentative standards, a lot of consensus of opinion and practise, a great deal of dogmatism and imitation, but few scientifically established standards. The recent investigations of ventilation, for example, have destroyed the old opinion-standards of the baleful effects of carbon dioxide and lack of oxygen in classrooms, and there is a tendency to deride the costly and intricate mechanical ventilation systems of the present and to rush to open and fresh-air rooms and schools. Any observant person in education knows of multitudes of expensive school sanitation fads and fashions that have come and gone, seeming to benefit principally only the fashioners and sellers of the "latest thing" to unsuspecting school men and boards of education.

Undoubtedly great good, as well as much harm, has been done by the wide-spread adoption of new opinion-standards. The remarkable progress of city school sanitation is due largely to this one factor. The unrivalled advance in hospital and office-building architecture and sanitation has had, too, its more scientific influence. But think of the cost and the injury of such methods! Millions for change but not one cent for scientific investigation, has been our motto. Word goes out from some bureau, book, or self-styled expert that, for instance, the lighting of schools should be from the left side only, and schools everywhere gradually adopt this norm. But the schools of the future, especially small rural schools, may some day be changing back to lighting on both sides of the classroom, because scientific study may show that the shadows of pupils' pencils and hands on their papers are not seriously detrimental if at all, or that other features, such as more illumination, or cross ventilation in hot weather, are of greater hygienic importance. We do not know! It is quite possible, at any rate, for a scientific investigation of school ventilation problems, such as the Thorndike-Winslow[1] experimentation now going on, to overthrow many cherished-as-absolute standards of the past, and to do a million times more real lasting good than many whole State surveys which say: "This is bad according to our (opinion) standard and your laws must be immediately made to enforce the change."

Being practically without very stable and scientific standards, then, we must content ourselves with cautious statement, in the briefest terms, of some of the empirically derived and established standards now available. They can be found scattered in many publications and in evidence in many schools in many places. We shall emphasize the larger, city school because the rural school problem has two chapters devoted to it. In certain cases sanitary standards will of course have to be sacrificed for large educational or

[1] See "Some Results of the First Year's Work of the N. Y. State Commission on Ventilation," *American Journal of Public Health*, Feb., 1915.

social ends. The centre of a neighborhood, for example, may not have as good soil as other locations and yet it may be best to choose it, all things considered.

Tentative School Sanitation Standards

I. **The Site.**—(1) Speaking generally, as we must throughout, the site should be on rather elevated, porous, uncontaminated soil, preferably gravel and sand. Muddy, wet feet and clothing, and foul air rising through the basement from a contaminated soil, must be avoided.

(2) **Size.**—Ten to twenty acres of good land should be made available for consolidated rural schools, two to three acres for school and neighborhood playgrounds. Thirty square feet of play space for each pupil as a minimum has been made a standard by the National Playground Association of America. Dresslar is authority for the statement that "according to the rules of the London School Board 100 square feet of play space is required for each pupil."[1] Allowance must be made for the future extensions of the building and for any parking space absolutely required. A full city block is a convenient minimum standard. Where blocks are as small as 200 feet square, two for each school will frequently be standard.

(3) **Surroundings.**—The school site must be in a quiet place, free from dust, bad odors, and gases, overshadowing buildings, and away from sources of ill health or injury to pupils. This standard rules out thousands of American schools, now located on street-car, automobile, heavy-traffic, and even steam-railway streets or lines, or near dusty roads or factories, gas-houses, livery barns, planing-mills, saloons and other such houses, etc. Foresight and the law must be used to protect schools from such dangers to life, nerves, health, and sanitation.

II. **The Building.**—(1) The building should be arranged longitudinally, so classrooms may have unilateral east or west

[1] Portland, Oregon, School Survey, p. 220.

lighting, the children in the rooms on the west side of the building (if of several rooms) facing north and those in rooms on the east facing south.

(2) If possible, the building should be placed at the west side of the school site, with the separate heating plant to the west of the building. This puts almost the entire playground in front of the school building, where it can be supervised to some extent from the principal's office (when he cannot get out), which should probably be in the middle of the front on the second floor. If this part of the building is made to project somewhat, windows may be put into the office to give north and south views of the playground also. The Bernard Moose School, of Chicago, designed by Dwight L. Perkins, is built in this manner.

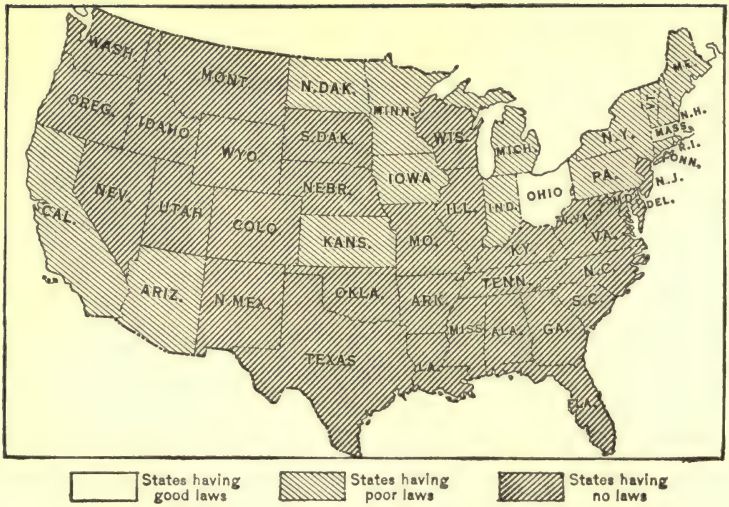
(3) The rear of the building to the west, with its separate heating plant and smoke-stack, should be made as attractive as the front if possible, so the building will not have to "turn its back" on any neighborhood.

(4) Practically every school should have a well-lighted concrete basement. In smaller schools the heating plant will be located here. Great care should be taken to prevent the upward movement of moisture in the walls to the school walls above. Slate, pitch, and other substances are used to cut off this upward movement.

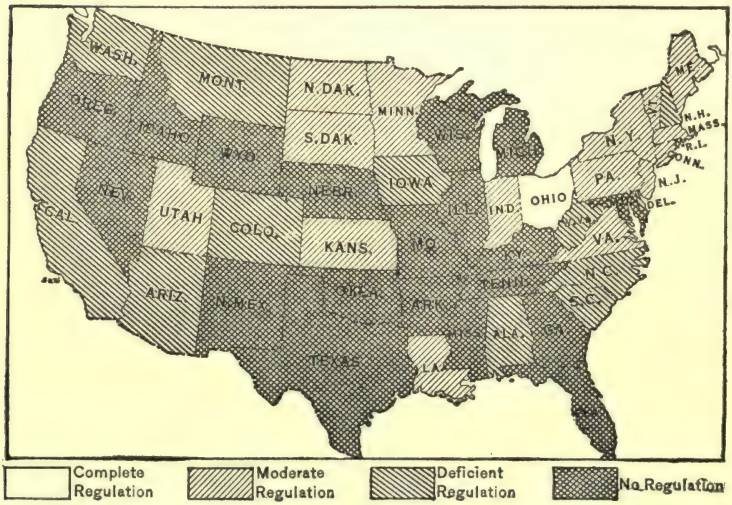
(5) Arched roofs and steeples are rapidly giving way to flat roofs, and very low towers if any, on the larger school buildings of four or more rooms. Roof playgrounds should be provided where needed.

(6) Every school building should be as nearly fire-proof as possible, and the larger the building the more emphasis there should be on this factor. We have lost too many buildings and children by fire. An average of ten school buildings burn each week of the year, two each school day.

(7) The following helpful suggestions for making schools fire and panic proof are taken from "Fire Protection in Public Schools," distributed by the Division of Education, Russell Sage Foundation. See also the maps which follow.



FIRE PROTECTION LEGISLATION FOR SCHOOLHOUSES



LAWS RELATING TO SCHOOLHOUSE CONSTRUCTION IN EACH STATE IN 1912

(From "A Comparative Study of Public School Systems in Forty-Eight States" by the Russell Sage Foundation.)

STAIR AND EXIT RULE OF NEW YORK CITY[1]

(1) All school buildings of two or more stories in height shall have at least two stairways. The number and width of stairways shall be apportioned as follows: Four feet for the first 50 pupils and six inches additional width for each additional 50 pupils.

Note.—The number of stairways shall be sufficient to permit of building being vacated in orderly manner within three minutes from sounding of signal. Most fires spread rapidly. Any longer delay may result in exits being cut off.

(2) In estimating number of occupants for each story, an allowance shall be made of fifteen square feet of floor space per person per classroom.

(3) Stairs shall not be less than four feet nor more than five feet in width between strings. The four-foot width for elementary schools is preferable. Width is fixed at four feet to prevent a third line of pupils without handrail support.

(4) There shall be a handrail on each side.

(5) No closets shall be placed under stairs. Where they exist they shall be kept empty and locked.

(6) All stairs shall be enclosed in wire-glass and steel or other fireproof partitions from top to bottom, access being by means of self-closing fire-proof doors. These doors are held open by fusible links.

(7) There shall be an allowance made of fifteen lineal feet width of doorways for the first 500, and six inches additional width for each 100 additional, persons. These widths should be increased by 50 per cent if there be an auditorium on the first floor, or basement which has not direct exits.

IF YOU ARE TO HAVE A NEW SCHOOL BUILDING

(1) Employ an architect who knows what it means to erect a fireproof building and then——

(2) See that his plans call for:

(*a*) Fire-proof construction.

(*b*) Building of not more than three, and if possible not more than two, stories.

(*c*) If a large school, each floor constructed with fire-proof partitions, so that one section may be completely shut off from the rest.

(*d*) Heating plant separated from rest of building by fire-proof walls, ceilings, and doors.

(*e*) Assembly-room on ground floor.

(*f*) Attic cut by at least one partition, to prevent draughts.

[1] From a Sage Foundation pamphlet on fire prevention.

(*g*) Stairs located at opposite ends of building, and leading directly to exits.

(*h*) Stairs built according to the "stair rule." (See above.)

(*i*) Halls wide, well lighted, and absolutely free from obstructions.

(*j*) Outer doors furnished with "panic bolts" which can be opened from inside by slight pressure.

(*k*) Automatic sprinklers in storeroom and fuel-room.

And then—

(3) See that the building is constructed according to the specifications.

IF YOU HAVE AN OLD SCHOOL BUILDING

(1) Transform stairs into fire-proof exits by following the rule given above. See that stairs lead directly to outer doors, even if their location has to be changed.

(2) Make basement ceiling fire-proof.

(3) Abolish double doors. Substitute single doors, swinging outward, side by side, and equipped with "panic bolts." Absolutely prohibit fastening of any outside door during school hours.

(4) See that ashes, waste paper, and other rubbish are placed separately in metal, self-closing receivers, and removed from building at close of each day.

(5) See that building is equipped with:

(*a*) Automatic fire-alarm.

(*b*) Complete system of fire signals.

(*c*) Signal connection with fire headquarters.

(6) Require halls to be kept absolutely free from lockers, tables, chairs, and all other obstructions.

(7) Insist on a fire-drill every two weeks.

(8) The building must be as free from dust-catchers as possible. All interior woodwork should be without unnecessary flutes and grooves. Fluted or beaded ceilings or wainscoting, and much-decorated washboards and blackboard frames, are inadmissible. Picture mouldings are recommended, but they should be devised to catch little dust. Dresslar would eliminate them, but they seem desirable for non-sanitary reasons. The hospital ideal is not too good for the schools. Beauty need not be sacrificed but may be enhanced by thoroughly sanitary construction.

(9) Corridors may be a standard width of 14 feet in schools

of several rooms. In the far West a new standard of having one-story buildings with classrooms on one side of the corridor only is being advocated, and seems desirable for that climate in cities that will provide the necessary land space. All corridors should be *well lighted*, should have cement or light-colored composition floors, should be unencumbered with lockers or wardrobes, and should be provided with satisfactory drinking-fountains, preferably in "batteries" of four or more over a narrow trough close to the wall. The latter need not be as elaborate and costly as are frequently purchased.

(10) All other flooring should be sound-proofed and made of close-grained hardwood or of rift-sawed pine. As soon as laid, the floor should be given, well rubbed in, two coats of *boiling* linseed-oil, in which one pound of paraffin to each gallon of oil has been dissolved. This coating closes up and protects the wood and provides a vitreous-like surface easily cleaned and hard to splinter.[1] (See later standards for cleaning.)

III. **The Standard Classroom. Elementary Schools.**— Standards for elementary classrooms have been gradually developed on the basis of present knowledge and theory until many of the features have been finally adopted by school officials in many parts of the country, especially by State boards of education and progressive school architects. Within certain limits there will remain considerable variation, especially as our scientific knowledge of children and of sanitation increases. The classroom is the centre of the school. Here teacher and pupils engage for most of the time in that activity for which schools are primarily created. The sanitation of the classroom should therefore be as perfect as possible. We cannot give here the arguments leading up to each feature, nor a discussion of reasonable variations. A statement of a desirable norm only is attempted.

[1] See the Springfield, Ill., Survey for attention to better specifications and better supervision of construction.

(1) Architects must provide one or more standard classrooms for each school building. The standard classroom is the unit of construction. Instead of devising a building of a certain size and then putting in classrooms, they must reverse the usual process and provide the required number of standard classrooms and erect the building about them. With so many millions of dollars going each year into new school buildings, coupled with the fact that so many old schools are burning down, it seems that this country should soon experimentally develop ideal buildings. Scientific study and expert school architects only are lacking to make the most of our opportunities, but they are surely, though slowly, coming.

(2) **Size.**—The best size for an elementary classroom for about forty pupils seems to be, all matters considered: length 32 feet, height 13 feet, width 24 feet. This size has in consideration sufficient lighting space, the carrying power of voices, distance for seeing and hearing, ease of class management and instruction, ventilation, building economy, etc. The height may be reduced six inches and the length a foot or more, if desired. In high schools the height should be the same, but the floor area and shape must be variable.[1]

(3) **Lighting.**—In standard classrooms the lighting, measured in area of window-glass, should be at least one-fifth to one-fourth of the area of the floor space. The floor area (24 x 32) is 768 square feet. One-fourth of this is 192 square feet and one-fifth is 153 square feet. This lighting should be from the left side only of the pupils seated, with few exceptions later to be mentioned. Windows should reach to within five or six inches of the ceiling—the higher the better, since about one-third of the light comes in at the upper fourth of the windows. The windows, on the thirteen-foot wall, should not reach below a line three and one-half feet above the floor; should extend as far toward the rear of the room as

[1] See Dresslar's "School Architecture," published by the U. S. Bureau of Education, for valuable data on high schools.

possible (within eighteen inches); should not extend far enough forward to throw much light into pupils' eyes; and should have the narrowest possible piers or mullions between the windows, say one foot as a maximum and these bevelled. Round or gothic topped windows should not be permitted. In upper grades, the height from the floor may be four feet. This leaves an eight and one-half or nine-foot window in length. The width of the glass panes may well be about forty-two inches and height forty-five inches. Small panes are generally less desirable. Starting the windows with the glass of the rear window about fifteen or eighteen inches from the rear wall and leaving not over twelve inches between windows, glass to glass, for mullions and (steel) lintels, with nine-foot windows, we find that we can put in five such windows and get a glass surface of about one hundred and sixty square feet, leaving nine feet of blank wall at the front of the room. Not less than six or seven feet should be left a solid wall at the front. By reducing the width of windows three inches (to thirty-nine inches) *six* windows may be put in, giving a lighting area of about one hundred and seventy-five square feet. The latter is probably preferable in most cases. The use of a twelve and one-half foot ceiling is economical but makes nine-foot windows impossible except in primary rooms where the bottoms are only three and a half feet from the floor.[1]

An increase in the width of the windows to four feet has been tried successfully in some schools. Such width helps to reduce the number of mullions between windows by one, and gives a lighting space of about one hundred and eighty square feet with five windows. This is almost ideal, but requires that the windows be well put in so they may be easily handled. This gives also a well-lighted blackboard, but

[1] Dresslar recommends this, however, in his "School Hygiene," p. 61. The Sharp-Millar photometer is a good instrument for measuring actual illumination. Standard: three foot-candles at worst-lighted desk on a cloudy day. Dr. Fitz gives a new method of determining lighting values in the Proceedings of the Fourth International Congress on School Hygiene.

teachers should not make a habit of standing near the front, window side of the room, in order to keep children from facing the light when looking at her. A door into the cloak-room at the front of the room on the lighted side makes it impossible to place a blackboard in this corner, which is an advantage from this point of view.

It is injurious to the eyes to face windows, both for teachers and pupils; consequently there should be no windows on the front wall, and on the rear wall only when it is thought desirable for ventilation. If the rear wall is an outside wall, small windows placed high (eight feet from the floor), with their tops on a level with the other windows and with stained or other glass not admitting much light, may be used. This gives a window the size of the upper sash of the other windows. These half-windows may, however, be narrower, and should be hinged at the bottom and have a spring catch at the top. Light from the rear is good for the pupils but not for the teacher.

It is possible to have such windows also on the right side of the pupils seated, thus giving light and ventilation into the corridor. These may well swing on a pivot and be controlled by iron levers. These extra openings are principally for ventilation, however, rather than for lighting. I have seen such "transoms" working admirably.

Windows in rear or right-side walls need not be put in merely for the sake of outside decoration. Architects have devised many ways of beautifying blank walls where there are no windows.

Artificial Lighting.—All classrooms should have artificial lighting for use on very dark days and especially for evening use. If possible, electricity should always be used, and all buildings should be well wired when constructed. Gas-pipes should also be installed where gas is available. Acetylene lighting has been found satisfactory in rural schools where the other forms are unavailable. Much attention should be given to the proper placing of the various ceiling

lights and to bringing sufficient light from the proper angle to all seats in the room. Where there are six rows of well-placed single seats, the front row of ceiling lights, say three in number, may be placed a little in front and to the left of the first desk near the window, the third desk from the window, and the fifth. The second row may be over the first, third, and fifth desks in the third cross row of seats, while the third row may be placed similarly just back of the fifth row.[1]

Window-Shades.—Most window-shades in schools are objectionable, either because they are not translucent and so cut off too much light when down, or they are hard to manage, or they cannot be adjusted to diminish only the light which is too bright for the pupils' eyes. The Draper and other window-shades can be easily adjusted to cut out light where desired, and the plan of having the curtain roll at the bottom instead of the top, or of having two rolls at the middle, is to be commended. Ecru or light-tan color has been highly recommended. Dark green should be avoided. Light green or light gray may be used to harmonize with wall colors. The ideal is to get plenty of light without cutting off too much and without allowing the direct rays of the sun to fall on the pupils' work.[2]

Wall Colors.—All walls should be smooth but not glossy, and painted with washable flat paint in light tans, light greens, light buffs, or light grays. A cement dado should take the place of the ordinary wooden wainscoting, and may be painted a darker color than the walls above. The ceiling may be nearly white in color. Great differences in light can be made by giving care to wall colors. In corridors, more white can be used without injury to pupils' eyes, and white tiling for the first four or five feet above the floor is desirable.

[1] See Dresslar's "School Hygiene," p. 78.

[2] Doctor Ayres found in the Springfield, Ill., Survey that the illumination was kept below the standard of three foot-candles even on bright days, because teachers did not properly adjust the shades, and that windows covered with dirt and coal-soot cut off in some cases 50 per cent of the light.

Blackboards absorb much light but can easily be covered by curtains, matching the wall color, which can be pulled down when blackboards are not in use. Such curtains function also in keeping work that the teacher puts on at intermission from the children's gaze until they are ready to work on it. Sliding blackboards have been invented.

(4) **Heating.**—The standards for heating one or two room buildings are discussed in other chapters. The proper temperature for classrooms in this country is from 65 to 68 degrees. Rooms should be allowed to go above 70 degrees only on cold mornings while the building is being heated up. The air should be about half-saturated with moisture, say 55 per cent. No dogmatic and general standards can be made here for all sections of a great country like America, and for schools of all sizes from one to a hundred rooms. Hot-air furnaces for small schools of two to six rooms are in some cases desirable, especially in the places where there are mild winters. Hot-water heating has many advantages, but is slow, and not desirable for the more northern schools, perhaps. Steam-heating is growing in favor in all of the larger schools. It works well with a fan (plenum or exhaust or both) system of ventilation. When we have the air entering the rooms slightly heated and the air heated indirectly by radiators also, we have what is called the very common and desirable "direct-indirect" method of heating schools.

(5) **Ventilation.**—The problem of furnishing 40 or more children, seated for hours at a time in a single room containing less than 10,000 cubic feet of space, with a sufficient amount of fresh warm air without draughts is one of the most serious problems of school sanitation. Two movements tend to disturb our standards in this field at the present time: The open-air-school movement has brought a great emphasis on obtaining outdoor conditions without great discomfort, and a wide-spread discontent with current methods of ventilation. Secondly, the numerous scientific studies and experiments of recent years have fairly well proved that it is

not the lack of oxygen, or the excess of carbon dioxide or of organic particles that makes schoolroom air unfit to breathe, but that it is improper temperature, lack of variation in temperature and movement of the air, and lack of humidity that cause the bad effects. These two beliefs have led to two principal applications: furnish less heat and make classrooms into *fresh* or *open air* rooms, and, second, make classrooms into *closed-air* rooms, and by the use of return ducts and careful air-washing and humidifying return all air to the classrooms, thus making it recirculate over and over again.

Not counting the initial costs of any changes in windows or the purchase of bags for the children to sit in in cold weather the open-air room is evidently more economical than the fan system, saving very much in the way of coal. Likewise, overlooking the cost of return ducts, air-washers, and closing up of cracks, the recirculation of the air for given lengths of time is very much more economical than the present systems, which heat up a lot of air and then force it out almost immediately in the effort to get proper ventilation. Experiments made at Springfield, Massachusetts, and elsewhere indicate a saving of about 40 per cent in fuel. The air is cleaned, made moist, and is used for a half-day or so at a time without change. It is claimed that the air is unobjectionable by this method and that it is even better than the outside air, being free from dust. By bringing such air into the rooms near the pupils' faces, as in the Minnesota experiment,[1] and by varying the velocity occasionally, coupled with arrangements by which rooms are occasionally flushed with fresh outdoor air, it seems that we have here the beginnings of an economical method quite different from the one so long employed where we have tried to heat up and push through schoolrooms and on outdoors 2,000 cubic feet per minute per classroom. We must await further experiments and tests

[1] See address by Professor Bass in the Proceedings of the Fourth International School Hygiene Congress, also addresses by McCurdy, Gulick, and others. See also articles by Kimball and Winslow in *Science* for April 30, 1915.

along this line. Perhaps the open-air method can in the future be employed in mild and warm weather and the recirculation device utilized in cold weather.[1]

Open-Air Rooms.—Another chapter deals with open-air rooms and schools. The proper construction of windows for such rooms is still in the experimental stage, although such bodies as the Boston Schoolhouse Commission and others have given the matter much study and have succeeded fairly well. The Oakland School-Building Inquiry recommended that "in each new building there shall be at least one open-air schoolroom that cannot be entirely closed, preferably opening to the east. In all new buildings there shall be provision made whereby every classroom may be easily transformed into an open-air room, such transforming measures not to be under the control of teachers and pupils."

One plan that has seemed to work has been that of making the entire window in one sash and hinging this at the top so it can be pulled inward and upward by a strong cord and fastened. Many other plans are being used.

Common Methods of Ventilation.—Three common methods of ventilation are in vogue: *window* ventilation, *gravity* ventilation, and *mechanical* ventilation. Most schools of our country use the first method but with notoriously poor results. Little attention is paid to ventilation in most homes, since there are so few persons to a room, since all are free to move about, and since enough air frequently slips in at cracks and through walls to supply fairly well the needs of ventilation, although there is probably also a great lack of proper ventilation in many homes, especially in sleeping-rooms. Most schools have in the past been provided with as little means of proper ventilation as most homes, but the conditions are entirely different, especially in the great number of per-

[1] See chapter on the "Physiology of Ventilation" in Terman's "The Hygiene of the School Child," Hill's pamphlet on "The Relation of the Atmosphere to Our Health," published by the Smithsonian Institution, Washington, D. C., and Kimball's articles in the *School Board Journal* for 1914–15.

sons from different families that are here collected together to remain relatively fixed in stationary seats. Teachers are typically young women without a professional education and with little training or knowledge of ventilation needs and devices. They must study and be trained along these lines.

Window Methods.—Windows should be opened and the rooms flushed out with outdoor air at all recesses and intermissions. Further, teachers and pupils need not be afraid of fresh air in classrooms. By keeping on more clothing than in a seventy-degree atmosphere teachers and pupils can easily and quickly accustom themselves to almost outdoor conditions even in cold weather. They usually profit by it, becoming enthusiastic champions of fresh air. Draughts should be avoided when they strike directly on pupils. *Window-boards* six inches in width and the width of the window in length may be placed beneath the window in such a way as completely to close up the space at the bottom of the window but leave a space between the sashes in the middle of the window where the air will come in when it is colder outside than inside, without a draught on any pupil. Such boards are awkward to remove unless they are cut into and hinged in the middle. Any boy can make one for each window in a short time or, better still, a group of boys can make them co-operatively. If too much light is cut out by this method, upward and inward slanting glass deflectors may be used. Dresslar describes three kinds in his article on "Ventilation" in Monroe's "Cyclopedia of Education," volume five. Teachers should study the matter even where they have gravity systems of ventilation. If in the middle of a period the room gets foul, the children may be given calisthenics or marching, or may be sent to run around the house once or twice, while the room is being flushed. The teacher must cultivate a sensitive nose for bad air and remember at all times that the tendency is to get gradually accustomed to poorer air as a period goes forward.

Gravity Systems.—Differences in weight of warm and cold air make possible in cold weather, when windows cannot well

be opened without draughts and heat-expense, systems known as gravity systems. They are generally not efficient enough for schools except in the coldest weather, but must be used in all small schools where forced, mechanical draughts are out of the question because of the expense. The jacketed stove has been described in the chapter on "Rural School Sanitation" by Mr. Monahan. Heat within the jacket and heat in the chimney about the aspirating or outlet duct for foul air causes the air to rise and spread in the room and to be forced out by the colder air coming from without through a flue passing under the floor to a vent within the jacket of the stove. Care must be taken to insure that the fresh air brought in is not that from under the building and that the opening to the outside is covered with a screen.

The hot-air furnace is another gravity system. The furnace is usually placed beneath the floor in the basement and has a flue bringing in outside air and other flues or pipes taking the air up to the room or rooms. The fresh air coming from the furnace should enter the room on an inside wall if possible and about eight feet from the floor. All persons putting in such devices should get expert advice from either the State department of education located in the capital city or from the United States Bureau of Education at Washington. This applies to most sanitary features, especially to the plans and construction of the school itself, and is about the most valuable recommendation of this entire chapter. Get expert advice and save for years to come not only the money of the community but its comfort and health.

Mechanical Systems of Ventilation.—This plan does not depend upon gravity alone but puts a fan into the system to force the air into the rooms, the plenum system; and frequently adds to this in large buildings another fan near the top of the building to blow the air out, the vacuum or exhaust system. Where the upper fan is omitted, a feature of the gravity system is sometimes added in the form of small steam coils in the foul-air flues to heat the outgoing air and make it

rise faster. Generally the plenum fan or blower in the basement is sufficient.

Accepted standards for such ventilation require at least thirty cubic feet of air for each person in the room per minute. The air should enter the room at a height of eight feet above the floor through a vent about two feet square. If a grating is placed over this inlet it should be of such small cross-bars as not seriously to retard the air. It should also have deflectors attached to throw the air upward and toward all parts of the room. The speed of the entering air should not be more than 400 feet a minute as measured by the anemometer (a small fan wheel connected with a clock-like recording arrangement to measure velocity). The ducts to each room of forty pupils should be at least four feet square in cross-section, so as to keep the velocity within them down below 600 feet a minute. The entrance duct may be at the front of the room and the outlet duct (four square feet in area) at the floor in the same wall, with another outlet six to eight feet above the floor in the cloak-room behind the front wall of the classroom. The air can be made to reach the cloak-room by placing openings in the bottom of the doors leading from the classroom to the cloak-room. Such an arrangement helps to dry and aerify the clothing. Long hooks far enough apart should be used to keep the clothing from contact, and open for drying and aeration. This cloak-room should be about six feet in width and should have no door leading into the corridor. A large window should light it well, and drip-troughs for umbrellas and pigeonholes for overshoes should be provided.

The fan or blower in the basement should be noiseless and should be large enough to provide an ounce of pressure without running more than three hundred revolutions per minute.[1] The fresh air should be taken from a point where there is little dust or smoke, which in cities is usually high in the air above the roof. If the air is still dusty or smoky it should be washed

[1] Professor Caswell Ellis in the *School Board Journal* for September, 1913.

before entering the rooms. Numerous devices for air-washing have been devised, about the best at present providing for passing the air through a stream or "rain" of water dropping from small holes in a pipe across the passage. Professor Whipple, of Harvard, has made a number of very valuable experiments in this field. Such an arrangement if properly put in may provide sufficient humidity to the warmed air also. The standard for humidity is about 55 per cent saturation.[1] Steam pans, as in the Horace Mann School, Columbia University, work very well as humidifiers if large and well regulated by automatic devices controlling both temperature and amount of moisture, but do not clean the air appreciably. A great fault with most such systems is that janitors persistently overheat ("cook") the air. It is doubtful if the air should ever be hotter than 65 degrees Fahrenheit in the fan-room of the basement, and very little warmer when it enters the rooms. The radiators principally should be depended on for heat. The air should be kept as cool as possible consistent with comfort. Provision should be made whereby the air may be shunted at times into the ducts without passing through the heat coils across the entrance to the fan-room, thus making it possible to get fresh outdoor air at physical training or other periods. In the writer's own experiments a hinged screen was thrown in front of the coils and a door at the side opened into the fan-room to let the fresh air directly into the fan.

The air velocity of all rooms should be measured once or twice a year or whenever a room seems to be getting too much or too little air. The supervisor of hygiene may do this or teach principals how to do it. The velocity of the incoming air should be taken as the average of several measurements at

[1] The sling psychrometer, or hygrometer, especially the one made by Max Kohl, is a good instrument for measuring the percentages of moistures. Tables must be used, however, to calculate the amount. The best simple instrument which dispenses with calculation and can be read directly is the hair hygrometer, as easily read by a teacher or pupil as a clock. (Made by the Central Scientific Co., Chicago.)

several points on the four-square-foot surface of the mouth of the duct. This average velocity for the whole area should be multiplied by the area in square feet to get the quantity entering for a given length of time, say thirty seconds. This product divided by the number of pupils and teachers in the room will give the average amount coming in for each person.

(6) **Blackboards.**—Blackboards should be of slate, although glass and composition boards are being slowly perfected. In the standard classroom, blackboards will be placed on the rear, right, and front walls. They must be written on by both teacher and pupils and should consequently be wide enough to meet the needs of both. The front board may well be 5½ feet wide, the others 4 feet, or perhaps 3½ feet, to avoid as much light-absorption as possible. In primary rooms the bottoms of the boards should be not higher than about 26 inches from the floor, and in upper grades and high school about 30 to 38 inches above the floor. The increase in height may be graded between these extremes. Hard, dustless chalk should be used, and wire hinged screens should cover chalk troughs. Curtains on rollers of a light color may be used, as suggested, to cover boards when not in use, in order to prevent light-absorption. Soft, dustless erasers should be used and these should be cleaned once a week or oftener by the janitor or other persons. Where there is a vacuum-cleaning system, erasers furnish no problem. Dresslar in his "School Hygiene" gives several good suggestions along this line.

(7) **Water.**—Some have set the standard of hot and cold running water in a fixed bowl in every classroom or cloak-room, and certainly this will come in all of the most sanitary schools. Pupils need plenty of water to drink and they need to keep clean. Drawing and other forms of work require water and some forms make pupils dirty enough to require washing. Where the basin is located in the cloak-room the floor may be made of the same composition as that of the corridors—cement, tile, asphalt, or composition. The cold-water faucet should be equipped with a sanitary drinking-

fountain. Rural schools may now have drinking-fountains, as shown in another chapter. Common cups and individual cups should go. Common towels should also disappear like the old feather duster. Paper towels are now cheap and efficient enough to be provided all children. Real sanitary habits cannot come without them. Soap may be supplied in liquid form from automatic containers. Health habits cannot be developed with no opportunity to practise health acts. Anti-Typhoid Mary habits come with exercise.

(8) **School Desks.**—School desks are in a transitional stage also. They should provide for different types of work than formerly, *e. g.*, manual training; they must be individual; they must be adjustable, seat and desk; they should be thoroughly sanitary (neither dust-catchers nor hard to clean under); the tops should be adjustable for writing, reading, and manual work; and many are now demanding that they be movable on the floor. The Moulthrop school chair, a combined seat and desk, is about the best type that at the present meets the last and several other of the standards. The top can be tilted to hold a book while a pupil is reading or singing, and it can be moved forward and backward and up and down. The seat part is not yet made adjustable but is made in different sizes. These chairs can be moved by pupils to any part of the room, as the teacher or janitor wishes.

For a seat screwed to the floor, as few legs to interfere with sweeping and cleaning as possible should be provided—one for each pupil, instead of four to six, as is customary, if possible. The single-pedestal combined desk and seat meets this requirement well, the base being a large oval (front and back), closed iron standard. Such desks must be well put down to avoid wiggling by the pupil on the seat in front.

Dresslar gives twenty-one excellent standards for school desks in Monroe's "Cyclopedia of Education," which should be observed in every schoolhouse.

IV. Cleaning and Sanitation.—Cleanliness is the first principle of sanitation. Since most diseases are caused by germs and since these are best eradicated by cleanliness, we

have a fundamental law of school sanitation: Keep everything as clean as possible. First, we must have clean children with clean clothing and clean and filled teeth. This requires tactful work on the part of school-teachers and nurses, and co-operation on the part of parents. There must inevitably be provided in many places school baths and free school dentistry. Habits of personal cleanliness at the school must be inculcated persistently, such as cleaning the feet thoroughly on mats and scrapers provided, before entering the school, using a handkerchief (some teachers and nurses have used handkerchief as well as tooth-brush drills), bathing at least once a week, washing thoroughly before coming to school and at school when necessary, etc. Hot and cold water in stationary bowls for washing, paper towels, and liquid soap are requisites, especially in toilet-rooms. Second, the school must be in a clean location with clean air, walks, and yards. Third, the janitor must be trained to do his work in the best way. Feather dusters and dry sweeping should be abolished. Vacuum cleaning should be provided wherever possible. Floors should be oiled with a light oil several times during the year, thoroughly rubbed in and then carefully wiped off. Where there are no vacuum cleaners, oiled-hair filter brushes should be used instead of brooms. Every janitor and teacher should know how to make damp or oiled sawdust for sweeping, and teachers should demand that such a sweeping compound be used to keep down dust. Dusting should be done with a damp or oiled cloth, never with a dry cloth or feather duster. All floors should be swept daily and windows should be washed often enough to keep them clean, at least three times a year. Blackboards should be washed once a week. Toilet seats should be scrubbed daily. Floors should be scrubbed frequently if they are not oiled. Strange to say, floors may be scrubbed with oil and the floors kept fairly white and clean after years of oiling. As a principal I once had the teachers vote on the oiling or scrubbing of floors. They voted for scrubbing without the use of

oil, but in a month or two voted in again the use of oil. The janitor knew how to put it on and how to remove the part not absorbed by the wood, so skirts were little injured. The oil kept down the dust and kept the floor from wearing.

Third, the promiscuous use of pencils should be absolutely prohibited. One or two outbreaks of diphtheria and other diseases have been definitely traced to this pernicious custom this year. It is hoped that medical supervision will permanently kill this practise. If possible, pencils should never be collected together, not even in numbered receptacles, and pupils should be taught to avoid putting into their mouths the pencils of others or anything else another person has had in his mouth or possession, with few exceptions. School-books are not put into the mouth very much but should probably be sterilized occasionally by heated moist air. Rules along this line can be worked out by the supervisors of hygiene.[1]

V. Sanitation of Special Rooms and Features.—The above principles apply fairly well to all rooms. Toilets furnish a perpetual problem in this respect. Some of the newer buildings of Chicago and other cities have developed the tower construction for toilets, one toilet on each floor for both sexes, for pupils and for teachers. The towers provide separate ventilation and privacy, and seem a desirable invention. Many of our best city schools are taking the standard of a toilet-room for both sexes in connection with each class-room, so teachers may have better control, and so the usual mixture of all children from all rooms will not need to congregate together. The best practical plan for most schools at present is to have dry, well-lighted, and ventilated basements for the large toilet-rooms and to have smaller ones of one stool each on each floor for both sexes. Separate exhaust fans for toilets are necessary in large buildings.

The number of toilet seats needed is standardized at

[1] See "Man and the Microbe," by Winslow, in the *Popular Science Monthly* for July, 1914.

about one for each fifteen girls and one for about each twenty-five boys. One urinal stall for each thirty boys will be found sufficient, if the younger pupils are dismissed earlier than the older and the janitor supervises the toilet-room.

The One-Story, Top-Lighted School.—After a number of years the writer has come to the conclusion that wherever it is possible to secure sufficient land for a site, the ideal school, all things considered, is the one-story, top-lighted school. It is especially to be recommended for consolidated schools. The building may be constructed of concrete and have a single row of classrooms somewhat in the shape of a capital U with a middle extension for auditorium and gymnasium, making it more like a capital E. The inside of the E on the classroom wings may be flanked by a corridor which may be enclosed in glass in winter. The right side of each room above the blackboard may have the windows suggested above, as well as the rear, in certain cases, for ventilation purposes. The left may well be lighted as suggested above; and there may be a door from each classroom opening outward to the corridor on the right, and also to the playground at the left of the pupils as seated.

There may well be added the "saw-tooth plan," or other, of overhead lighting, under full control of the teacher, which will give plenty of light and sunshine to the room and make it possible to reverse the dimensions previously given (24×32) to a width of about thirty-two and a length of twenty-four. Such a room brings the pupils forward nearer the teacher, gives a longer front blackboard, gives two compact groups, right and left, for instruction instead of two or three long rows of children, and has other advantages.

The advantages of the one-story building are too numerous to mention here. The reader is referred to the editor's volume on the "Consolidated Rural School," and to the June, 1918, number of the *American Journal of School Hygiene*, Worcester, Mass., and to several articles by the editor in *The School Board Journal* in 1918–19.

III. THE HYGIENE OF INSTRUCTION

CHAPTER XVIII

THE GENERAL HYGIENE OF INSTRUCTION

The Problem.—In its application to the instruction of children, hygiene takes on a wider significance, if possible, than it does in any of its other special phases. In looking to prevention of immediate physical injury it is negative, in its care for future physical development it is positive in its view-point; but in addition it must concern itself with similar problems, negative and positive, with regard to mental health and development. It must study both the objective and the subjective results of school life. Therefore, while busied with the problem of providing conditions that make for such characteristics as strong muscles, deep breathing, erect posture, and clear vision, it must have an "ear to the ground," so to speak, for any condition that may lead to faulty habits of attention and association, hinder the development of good memory, or in any way interfere with the development or cultivation of the power to think clearly. Even the emotions must be considered, so that it devolves upon hygiene to consider the attitudes, healthful and otherwise, that are related to or that result from the child's experience in school. It is this broad, or, if you please, this multiple, view-point that determines what are the problems and what the methods of their solution in the hygiene of instruction, or, as it is termed by the editor, the hygiene of methods of teaching and management.

It has been pointed out that our army of school-children in this country is now some eighteen to twenty millions strong and that throughout the greater part of the year about half the waking time of these young recruits is spent in school.

They are there to receive instruction. It is for the same purpose that teachers are hired and that buildings and grounds are provided and equipped and maintained in every State.

Now, the fundamental principle of instruction is that the organism of the child is immature, is still developing, and that by imposing certain conditions we are able to influence, to modify, and to mould his physical and mental development. Instruction, therefore, touches his life at its most vital points.

But let us not forget that the child's response to bad may be as ready as that to good instruction. Bad environment or faulty methods may initiate abnormalities of development. This is especially true of the mental development of children who have inherited or acquired tendencies toward neuroses.

In the light of such facts, the importance of making the instruction of this army of future citizens hygienic looms large beyond our powers of comprehension. We are introduced here to problems that reach nation-wide and soul-deep. They are of vital importance to the domestic happiness and the prosperity of millions of future homes, and they relate themselves to a great extent to the economic welfare of every State.

Instruction is a general term and may be concerned with a wide range of activities, physical, mental, or both. A rigid classification and detailed treatment of these is out of the question here; I shall therefore only attempt to summarize the more important principles involved and give some of their applications, taking up first those of a more general nature and following with those that concern themselves more particularly with mental hygiene. It should be stated that in doing this I draw heavily from both published and unpublished material of Doctor Wm. H. Burnham, of Clark University, as well as from notes taken in his courses of lectures. Indeed, those paragraphs which deal more specifically with the characteristics of mental health do little more than to summarize his contributions in this field.

General Hygiene

Innate Ability.—Extended investigations have clearly demonstrated that children are not all equal with respect to their abilities along certain lines. Especially is this true in case of those mental powers upon which so much of the ordinary school instruction depends. Hygiene of instruction demands that this be recognized and that requirements be adapted to the abilities and individualities of the children.

Some children are mentally defective; they should be placed at once in special classes and receive special instruction by special methods. Some are merely slow in their development, constituting the type known as "retarded"; these, too, should be placed in special classes and given individual attention. With a little care they can, without injury, be brought up to the average, in course of time. On the other hand, to attempt to drive such pupils through their classes at the same pace and in company with their more developed comrades of equal age is in many cases merely to transform retardation into arrest.

Again, many a child is so unfortunate as to have inherited an unstable nervous system and thus have within him a strong tendency toward the development of some form of neurosis. Usually this is shown by such characteristics as nervousness, inability to sit still, and lack of motor control. Hygiene would demand that in such cases special care be taken to avoid overstrain from heavy work and that no tasks be given demanding strained attention for lengthy periods. Better to modify the instruction than to run the risk of throwing the nervous organization out of balance, perhaps for life.

Similarly, the unusually gifted pupil should receive some special consideration. Holding such a pupil to constant repetition of well-known and easy tasks that require no effort may lead to loss of interest, inattention, dawdling, and even failure. An otherwise specially promising pupil is thus transformed into a repeater and a dullard.

Stage of Development.—The fitting of instruction to the stage of the child's development, physical and mental, is of significance for hygiene.

Length of life cannot be depended upon as a measure of the advancement a child has made in his development. Girls are some two years ahead of boys in their development at the time of puberty, and progress more rapidly to maturity. Even among children of the same sex, variations are great. Phenomena of growth, pubescence, skeletal ossification, dentition—all these give evidence that the rapidity with which children approach maturity varies widely from individual to individual. The degree of relationship between these and the development of mental power has not been entirely worked out. A correlation is suggested, however, by such investigations as those of Porter, Smedley, and Crampton, in America, and of Grazianoff, Sack, Quirsfeld, and Riez, in Germany, all of whom found a close relationship between various phases of physical health and development on the one hand and either school success or mental power on the other.

As has often been pointed out, it is clear that there is a pedagogical and hygienic moral to be drawn from these facts, namely, that grading for educational or other purposes on the basis of chronological age, *i. e.*, age in years alone, is entirely inadequate. Doctor Crampton has demonstrated how true this is for pubescent boys. We may therefore state as a hygienic principle that grading, implying, as it does, a measurement of the amount and kind of work that may properly be required of a pupil, should be based upon the mental and physical powers to which he has attained at a given stage of development, regardless of what his age in years may be.

This principle becomes especially significant when applied to school beginners. As I have shown elsewhere, there is much evidence in support of the theory that a transition or "nodality" in general development occurs at about this time. This is indicated by a number of phenomena, such as variations in growth, second dentition, change of growth rate in

certain organs, and acquisitions of certain neuro-muscular and psychical powers. These do not occur in all children at a given age. Variations are great, as is well illustrated by skeletal ossification and by dentition.

The exact relationship of these phenomena to each other and to general development is not known, much less their relationship to mentality. But, however that may be, the fact that so many fundamental developmental changes occur at this period of life is sufficient basis for the demand that, until it is past, any instruction other than that partaking of the nature of free play and allowing for natural reactions and normal physical development should probably not be given. The hygiene of instruction up to the age of seven or eight years is distinctly the hygiene of general health and normal development. Moreover, there are many indications that those children who do not begin formal school work until about the eighth year are not only not handicapped but are rather benefited thereby in the long run. The interesting and accumulating data concerning certain precocious children who at a very early age gained remarkable command of certain forms of school knowledge have seemed to some to point in the opposite direction, but this is doubtful, to say the least.

So much for the general statement. But, again, the above facts justify the demand that when the time for school work does arrive, entrance be based not upon the mere age in years, but upon the degree of physical and mental development.

We hear much in these days about "repeaters." And truly our instruction is not hygienic when we have a high percentage of pupils in all our schools droning over again the work of last year. But, bearing in mind the great variation in development at this period, and also the general relationship between physical and mental development, it must follow that very many of the problems of "repeaters" in the grades would never be met if children were admitted to the first grades only on the basis of their fitness as indicated by stage of development.

Properly, grading should take into consideration at least those special phases of development that have been mentioned and possibly some others also. It must be admitted that no standards for such grading have been established. In view of their absence, and also in view of the fact that dentition is so closely related to development as a whole and to nutrition in particular, there is much to be said in favor of taking that as an index. Unless otherwise exceptionally well developed, there is, hygienically, some question as to whether a child who has not erupted his first permanent molars should begin formal school work.

Differences in the development of the sexes must be considered. At the period of life when school work is usually begun, girls are relatively more advanced than boys of equal age. The difference between them grows progressively greater up to the time of maturity, being especially significant during the pubertal years. This being true, the question is raised as to whether the instruction of the sexes should be the same from the beginning, but sufficient data are not yet available upon which to base a definite answer. On the other hand, the difference between the sexes at the pubertal period is so evident and so great that a differentiation of instruction becomes not only a hygienic but a pedagogical demand also.

Knowledge of mental development is not sufficiently accurate to admit of a close grading. Some facts of a general nature are known, however, a few of which relate themselves to our topic and may here be mentioned.

Much of present-day classroom procedure very easily approximates a reaction-time experiment. That is, the child is given a question to which he must reply in the briefest possible time. This is fundamentally wrong. It has been demonstrated experimentally that the child's mind reacts much more slowly than that of the adult, as shown by the greater length of time it takes him to make associations of ideas. Quick replies should therefore be neither required

nor expected from young children, especially when the material with which they deal is new and unfamiliar or difficult.

Questions should be clearly and definitely stated, and then a reasonable time for answer should be given, with some regard, of course, for individual differences of pupils. Driving the child to answer too rapidly is liable to result in habits of carelessness and inaccuracy, establishment of wrong reactions that may persist and impede thinking in the future, discouragement on account of failure, nervousness, and overstrain, or a combination of these. In any case, the result is liable to be detrimental to development of clear thinking and good mental power. In the early school years, *drill for speed should only follow the mastery of the proper associations.* When proper associations are firmly established, drill for speed is in place.

Again, the mental imagery of the child up to about the pubertal period is concrete rather than abstract. This is the normal condition; and instruction, to be hygienic, should take account of the fact. Power of abstract reasoning develops late—at least as late as the adolescent years. Stimulation to this kind of activity at too early an age is liable to cause premature development or overstrain, either of which is injurious and should be guarded against.

Doctor Hall's early investigation showed that a high percentage of children begin school remarkably poor in ideas gained from experience. A number of other investigations have since confirmed his results. Too often the school gives no opportunity to make up for this deficiency and the result is that pupils become drilled in a "word education" and lack the power either to think clearly or deal intelligently with a concrete situation requiring tact and mental power. Hygiene has an interest in developing healthy mental powers as well as preventing injury. The meaning of all this is, therefore, that during his early years the child in the grades should be put into possession of a wealth of concrete ideas and of the ability to use them, not introduced—much less driven—to

the working out of complicated, abstract problems like some that have found their way into our arithmetics, where the essential thing is a logical trick.

The span of attention is more limited in the child than in the adult. Also, the span for immediate memory is shorter in the earlier years than later in life. That is, the quantity of material that can be held in mind for immediate reproduction is considerably less. The child often does not understand a long sentence, even though it be presented in simple terms, because the first part of it is forgotten ere the last part of it is heard. In presenting material, therefore, sentences should be short, definite, and clear. Enumeration of a number of conditions that must be held in mind and upon which the correct answer depends leads to confusion and serves rather to obstruct than to facilitate development of power to think. In a conversation on this topic a teacher of some years' experience recently said to me: "That's just one of the points where I used to fail. I would ask a question and then add something to it to make it clear, when in reality I was only making it the more confusing to the minds of the pupils."

This is by no means a complete list of the mental differences between the young child on the one hand and the adolescent or adult on the other, but possibly these cases will serve to illustrate the principle that a hygienic instruction is one which is fitted to the stage of mental as well as physical development of the child.

Condition of Health.—Instruction in school should not proceed independently of the condition of the pupil's health. Most of the topics related to this principle belong properly in a discussion of school medical inspection and are discussed in detail elsewhere in this work. Little more than an enumeration of the most important ones is needed in this connection.

Freedom from disease, a well-nourished condition, good posture, good digestion, ability to sleep well—all these are essentials for mental as well as physical development. There

should be no hindrances to respiration. The child with obstructions such as adenoid growths in his nasal passages is less able to give sustained attention and profits much less from instruction than the one that breathes freely. Kaffemann is reported to have demonstrated experimentally that children with artificial nasal obstructions showed a decrease in ability to retain memory material. But more than this, it is a well-known fact that the child with adenoids is liable to be inattentive and "dull," and that he benefits both physically and mentally when they are successfully removed. Attention has elsewhere been called to the relation of physical defects to school progress. Tonsilar disturbances and enlarged glands should be carefully watched for and treated when necessary.

While not attempting to state which were the causal factors, Quirsfeld reports that he found among German children that a condition of lack of nourishment, weak musculature, enlarged glands, and weak mental powers were very liable to be found in the same pupils.

Since so much of the child's knowledge must be received through ear and eye, it is extremely important that these organs be free from defects. Special classes, if need be, should be furnished for those children who hear poorly. Meumann says that such conditions as bad hearing may go so far as to cause moral injury. Care of the eyes is equally, if not more, important. All the things that may be said regarding hygiene of vision apply here.

Good teeth, properly cared for, are essential to the health and comfort of the child and also to good school work. Numerous school dental clinics in this and other countries are evidence that this fact is being recognized. Röse has reported that among German children physical development was greatly influenced by defective teeth, that poorer physical development was accompanied by poorer mental power, and that the poorer the teeth the worse on the average were the grades of the children.

Finally, children with nervous disorders and symptoms of neurotic condition need the most careful attention. They should be free from strain of all kinds, in order to guard against nervous and mental disturbances that may be both serious and permanent.

Some precaution is needed, also, to prevent the spread of such things as bad motor habits, tics, and even in many cases certain defects of speech, which may easily become "psychic contagions."

The above list of topics is perhaps not entirely new, but the thing to be emphasized here is that these things are important for instruction, also for mental development. The maxim should always be: "Health first, then instruction."

Optimum Conditions for Work.—Having fitted the demands of the school to the child's innate ability, stage of development, and condition of health, the next step should be to look to the conditions under which the work is to be done.

Sufficient room for work, and an abundance of light and pure air, are essential. Undue distractions should be eliminated as far as possible. School-buildings should be located in quiet districts.

Subjects requiring strenuous effort should be studied during the early forenoon, when, as experiments have shown, the maximum of ability for the day is reached. Habit studies and routine work may come in the late forenoon or in afternoon hours. Daily application to strenuous work at a time when energy is at its ebb may be expected to result in nervousness, headaches, and a minimum of acquisition of real power. On the other hand, periods of the most strenuous work should not immediately follow each other. Ability is influenced by preceding work as well as by time of day. Strenuous tasks should be followed by a period of relaxation or lighter work before other equally strenuous tasks are begun.

Seasonal variations have also been noticed. Apparently the tide of mental ability runs low during the spring and early summer, when physical growth is greatest. School work

should be a little less strenuous at this time. On the basis of the same facts, the spring vacation finds a hygienic justification.

Some attention must be paid to the social environment. The presence of the teacher, the presence of other pupils, the knowledge of their attitudes toward the work being done—all these are of significance for the healthful exercise of the pupil's mental powers. Too great variation of ability in one class is bad. The best are not stimulated to work; the poorest are too much discouraged to do so. On the other hand, ability should not be perfectly uniform. A slight inequality stimulates the entire group to better efforts and greater development. Social environment is also a factor in the determination of whether home work is good or bad. For example, Schmidt found that among the parents of children who were doing home work some could be classed as "demanding," some as "hindering," and still others as "indifferent." Hygienists seem to be agreed that there should be no regular home work for any of the pupils of lower grades. There is less agreement with reference to home work by pupils of the upper grammar grades, but most admit that high-school pupils may do some home work without injury.

These conditions need attention if the surroundings of the school-child are to be made conducive to efficiency of work and a healthful development. School work is sufficiently unnatural and difficult at best, and injuries sufficiently numerous. Every precaution is needed to keep the child body and child mind growing and reacting normally and to prevent the further multiplication of "school injuries." Conditions should therefore be as nearly the best as it is possible to obtain.

Alternation of Work and Rest.—That the development of an organism is conditioned upon the rhythmical alternation of functioning and inactivity is a fundamental biological law. That this is true of physical development has been demonstrated by every athlete that ever went into training. Based upon this is the hygienic principle that periods of work should

alternate with periods of rest. The old maxim that "exercise strengthens" suggests at once the classic example of the blacksmith's arm, but a similar influence from exercise is as real in case of mental as in case of physical development. On the other hand, we scarcely need be reminded that the blacksmith does not use his arm without ceasing. Rest and time to rebuild tissue are essential. And if this is true for the hardened muscular cells of the blacksmith's biceps, how much more true is it for the delicate brain and nerve-cells upon which mental work depends!

If such analogous reasoning does not suffice, then one needs only to observe the nervousness, the inattention, the inability to think, that are displayed by a group of pupils at the close of a long and fatiguing school session.

Work is essential to development, but so also is rest; and both development and health are conditioned upon their proper balance. It is well for the child to work until he is tired, but he must have opportunity to rest afterward, not set to work immediately upon another fatiguing task. The measure of this balance is the readiness with which the child recovers. Prolonged work, whether physical or mental, is sure to result in nerve strain, and a condition of nerve strain is a condition of strength drain. When the strength thus drained is not recovered within a reasonable time, there is danger of injury.

The applications of this principle are many. I mention a few of the more important. The position in which the work of the school is to be done should be natural. When the strain from unnatural positions becomes too great, the child slumps down in an attempt to ease himself—to get needed rest—and bad posture with its attendant ills results. Strenuous physical exercise should not follow difficult mental work, especially where movements are difficult and require close attention. This does not rest; it only increases the fatigue. Conversely, a strenuous physical exercise should never be followed immediately by difficult mental work. Exercises in

singing, especially those in which attention to the reading of music is involved, should never be substituted for actual rest. They require attention and expenditure of energy and are more liable to produce than to relieve fatigue. Finally, by no means least in importance, frequent recesses should be given. Better work has been shown to result when recesses were frequent and short than when they were less frequent, even though longer.

Mental Hygiene

Mental hygiene as a science, the nativity of which does not date very far back in years, is founded largely upon contributions from psychology, normal and abnormal, psychiatry, physiology, and neurology. These sciences have in recent years contributed many significant facts regarding mental functioning and mental development and the conditions upon which they depend. It has been shown that much of the so-called abnormality, and much of the insanity even, is in great part the result of faulty mental habits developed early in life. The treatment for such conditions consists essentially in a re-education in proper habits of thinking.

Now, as has been repeatedly pointed out by Doctor Burnham, it is certainly a fact of some significance that many of the patients now receiving their re-education in special institutions were only a few years ago pupils in the public schools. A properly applied mental hygiene there would have instituted correct mental habits in a high percentage of cases and thus acted, at least in many borderline cases, as a preventive of much of the suffering, not to mention the expense and economic loss, to society. It is thus clear at once that the hygiene of instruction is in large part a mental hygiene, and this means that the school must pay proper attention to the cultivation of good mental habits.

Of prime importance here are habits of attention, association of ideas, and emotional expression. All these are essential to instruction at every point. Each involves and is

conditioned by the others in almost every situation, so that it is almost impossible to discuss them separately. Let us therefore turn attention for a few moments to the meaning and importance of each, taking up later the applications to school work and the conditions upon which they depend.

Attention.—From the functional view-point, attention is that reaction by virtue of which elements in a situation become more or less clear in consciousness. In its simplest, most primitive form, the reaction is direct and immediate, in response to a stimulus. In its developed form it is selective in its nature; certain elements are either pushed into the background or "fringe" of consciousness or excluded entirely, while others are brought to the foreground and thus become more clear.

But we must take care to interpret correctly. Consciousness is not static. Attention does not render its elements fixed. With a sort of panoramic sweep they change and flow, creating ever a new situation. In fact, the figure "stream of consciousness" has been very fittingly applied. There is therefore a constantly recurring readjustment, a shift of attention from moment to moment.

Now the ability to adjust to these changes, the ability to attend in a proper manner, is at once vital to clear thinking and to mental development. The lack of this ability, on the other hand, means difficulties of thought, abnormalities of mental development, and, in extreme cases, entire loss of mental balance and a pathological condition. The whole matter is, of course, complex; but, even though such phenomena as emotional response and association of ideas are involved, it may yet be said that ability to attend properly is largely a matter of habit. This is the point at which the topic of attention is linked with the hygiene of instruction. It becomes the business of the school to drill pupils, so far as is possible, in healthful habits of attention.

The healthful form for developed attention is suggested by the simpler, more primitive form. As intimated before, this

is direct and simple, bringing one element to the foreground. The school, therefore, should drill its pupils to attend to a situation in such a way that the essentials are brought to the foreground, while unessentials, whether relating to past, present, or future, are either excluded entirely or else pushed into the background or fringe of consciousness. In ordinary terms, this means the ability to concentrate upon the essentials of a situation, shifting attention from moment to moment in a way to present them to consciousness from a new viewpoint. To the problem of how this is to be accomplished in the school we shall a little later return.

Association.—Training in good habits of attention should be paralleled by training in habits of orderly association of ideas and the avoidance of interference. Briefly stated, interference means a struggle of ideas for possession of the foreground of consciousness. This problem has been dealt with in detail by Doctor Burnham, who would make the avoidance of interference the most general negative rule in mental hygiene. "We find interference of association," he says, "in an infinite number of forms, from the conflict of simultaneous stimuli in the nervous system and the relatively simple interference of incipient motor habits up to the confusion of thought in the individual who is worried or rattled or the patient who suffers from the insanity of doubt."

All persons experience an occasional interference of association. For example, do you spell receive with an *ei* or is it *ie?* Was it number 368 or 836? Or, again, a name cannot be recalled because a similar name crowds to the foreground and usurps the focus of consciousness.

Ordinarily these experiences last for but a moment, or at least for a few minutes, and are apparently harmless enough. Unfortunately, however, this is not always the case. Investigations have shown that, especially in case of persons with unstable nervous systems, conflicts of ideas or of complex systems of ideas may under the influence of strong emotional toning finally result in serious pathological conditions such as

obsession, dissociation, disintegration of personality, and loss of sanity.

I do not mean to assume that every case is to be taken as an indication of a pathological condition. I do wish, however, to lay stress upon the necessity of proper habits of association of ideas as an essential to mental health and the development of the power to think clearly; and I insist that it is imperative that the hygiene of instruction take account of these facts, namely: (1) In extreme cases interference of association may form the basis of bad habits of thought which lead later to pathological conditions and loss of sanity; (2) interference is ordinarily a common and normal occurrence but is often abnormal, and forms an obstruction to the free flow of ideas and to logical thinking and a hindrance to proper mental development; (3) the most successful method for treatment of pathological cases—the method of re-education—points to education in *proper* habits of association in the early years as the best means for prevention of such cases; (4) it therefore devolves upon the school, which assumes the burden of educating and moulding the child to so great an extent—largely by means of association of ideas—to see that instruction be such as to avoid as much as possible the abnormal interference of these associations and that proper habits be developed.

Emotions.—Habits of emotional response make up a third element of significance for mental health. Indeed, it is impossible absolutely to separate the child's emotional from his intellectual development—a fact, sad to say, that has not always been recognized by the schools.

The influence of affective or emotional elements upon conscious reaction has been clearly demonstrated in laboratory experiments during the last decade. Evidence of this is found in the "attitudes" that are so often to be dealt with in the working out of psychological problems. One needs but to mention a few of them, such as attitudes of indifference, prejudice, approval, etc., to show that they are normal matters of every-day experience. But they are not always necessarily so.

A persistent habit of assuming an attitude of disapproval may, for example, readily transform an individual into what is popularly termed a chronic grouch; certainly a habit that is not conducive to mental health. Similarly many other bad attitudes, such as jealousy, suspicion, distrust, etc., may become so ingrained as to become a hindrance to normal, healthful mental reactions. But these are only mild cases. In extreme cases, when combined with other bad mental habits, such as interference, for example, affective and emotional toning becomes an important factor in the development of pathological conditions. Interference, emotionally toned, begets worry; worry aggravates interference; and so the evil spreads until the victim is hopelessly enmeshed in a tangle of conflicting ideas and compelling emotions from which it is impossible for him to extricate himself.

It is a duty of the school to do all in its power to develop in the pupils those attitudes that are conducive to mental health. Possibly the whole secret for doing this has not yet been given to the world in full; but a large part of the secret is contained in the following expression: Freedom, Naturalness, Self-expression, Interest.

Practical Applications.—Some practical suggestions as to how the principles of mental health may be applied in the schoolroom are in place here.

(1) Make the instruction such as to enlist the permanent interest of the child. Faithful, energetic work on a problem of vital interest, even though it be not of long duration, will do much to develop good habits of attention and of association.

(2) The injunction to guard against overfatigue is again in place here. The fatigued child is the inattentive child, or, perhaps better, the badly attentive child. It is in this condition, too, that associations go wrong and interference is liable to be initiated, and unhealthful attitudes toward work develop.

(3) Make statements and questions commensurate with

the limited attention span of the child. Do not "scatter" the attention and initiate interference by means of much and confusing diction.

(4) Problems and tasks should not be too complex.

> "One thing at a time, and that done well,
> Is a very good rule, as many can tell."

In beginning penmanship, for example, it is too much to expect the young child to attend to the form of the letters, spelling of the words, holding to the line, neatness, manner of holding the pen, and posture, all at one time.

(5) Take account of the kind of work to be done and use a few moments to teach the pupil how to study it. For example, a leading question or two may make the difference between a history lesson carefully studied with interest and good attention, or a history lesson which is uninteresting and "memorized" imperfectly with many a shift of attention.

(6) In making assignments, give a definite task commensurate with the child's ability, require him to do it, then give some chance for relaxation.

(7) See that each child in the class or in the school succeeds at something. Not to do so is to bid for discouragement and unhealthful attitudes on the part of some pupils. Nothing is more true than the old maxim that "nothing succeeds like success."

(8) Select as teachers persons who are optimistic, joyous, tactful, enthusiastic, and sympathetic; and let teachers themselves practise good mental hygiene in the realization that most irritable, pessimistic, exacting attitudes of mind can be changed.

Summary

To summarize very briefly, the problems of the hygiene of instruction are those which have to do with the health and the normal development of both body and mind. The sub-

ject is therefore broad in its scope. As a result of the solution, or partial solution, of the problems concerned, the following general principles may be stated: The demands of instruction should be fitted first of all to the child's innate ability, stage of development, and condition of health, after which he should be given as nearly as possible optimum conditions in which to work; work and rest should be properly alternated in order to avoid injury from overfatigue; finally, regard should be had for the laws of mental health, so far as they are known, care being taken to develop proper habits of attention, association of ideas, and emotional response.

CHAPTER XIX

THE HYGIENE OF SCHOOL SUBJECTS

In this chapter the attempt is made to indicate some of the applications of the principles indicated in the preceding one to some of the most important subjects of the school curriculum. It is impossible to make a complete list, but the treatment of these most important subjects will, I hope, be of value.

Reading.—The emphasis upon reading is so nearly universal, both throughout the school years and throughout life, the amount of time spent upon it is so great, and other subjects in the school depend so much upon it, that compliance with the demands of hygiene for as nearly optimum conditions as possible becomes imperative. Without attaching special significance to their order, let us turn attention to the most important of these demands.

(1) First, hygiene demands that proper regard be had for the posture of the child. Suitable seats and desks, more complete descriptions of which are to be found in another chapter, are a necessity. They should be suited to the size of the pupil and so constructed as to make possible an easy, erect position, without strain; and they should support the book in a way to make reading possible without stooping and without bending forward the head or the body. Standing in line and holding heavy volumes in position for reading should not be required of pupils. Indeed, heavy volumes for regular use in any subject should be avoided, especially in case of the younger pupils. The carrying of such books is liable to be injurious.

(2) In the second place, hygiene demands that oral read-

ing should have proper regard for the organs of speech. Here are involved organs of respiration, vocalization, and articulation, and any rules having reference to their proper care, development, and training are applicable to the hygiene of reading.

In proper amounts and under proper conditions oral reading is a healthful exercise. Good breathing exercises and the development of good breathing habits are of value. The use of pure tone should be cultivated, but it should not be a monotone. Reading with expression brings various muscles into play, thus preventing rapid fatigue of the vocal organs. Training in habits of articulation is also valuable, since both in school and out a little articulation is better than much loud talking for making one's self heard, and it is much less injurious to the vocal organs.

Reading should never be so long nor so loud as to cause strain, hoarseness, or overfatigue of the vocal organs. Especially in the early years, excessive strain should be avoided; also at the time of voice mutation, which usually occurs at about the pubertal period. So also in case of colds or sore throat, after certain diseases that affect the throat, and where there are nasal obstructions or tonsilar disturbances, overstrain should be guarded against. Bad nasal and tonsilar conditions should receive medical attention immediately.

Speech defects constitute a special problem. Their causes are numerous, many of them lying outside the school, and in so far as treatment is concerned the cases belong in the hands of specialists. Within the school, however, oral work may be of value by drilling in habits of slow, deep breathing, rhythmical speaking and proper articulation of words, thus preventing or correcting bad habits which are liable to be contributing factors to defects of speech.

(3) Hygiene demands that care be taken to prevent school-books from becoming media for the spread of disease. Books pass from hand to hand and are liable to be thumbed by a number of individuals. Turning of pages with the tip

of the finger moistened in the mouth should never be tolerated. Special precautions are necessary in case of supplementary readers that are handed from class to class, also library books that circulate from home to home. The same applies to pencils and other objects, as taken up in the chapter on school sanitation.

(4) A fourth demand has reference to the organs of vision. All rules regarding the care of the eyes apply here. Some of these need special emphasis. Light should be abundant, but should not fall on books and desks in a way to cause a glare. Rules for posture are important again in this connection. The distance of the book from the eyes should not be such as to cause strain of the visual organs in reading—never less than twelve inches, according to a special committee report before the American School Hygiene Association, 1911.

Near work should alternate with that giving opportunity for distance-vision, thus relieving the strain caused by accommodation of the eye for close vision. In the report of the British Association for the Advancement of Science, 1912, the committee appointed to inquire into the influence of school-books upon eyesight writes as follows (p. 298):

> Children who do too much close eye work suffer in various ways: some simply from fatigue, showing itself by inattention, mental weariness, temporary dimness of sight, or aching of the eyes and head; some from congestion of the eyes, as shown by redness, watering, and frequent blinking. A certain number, in circumstances which predispose them to the disorder, develop strabismus, or squint. Some others —and these cases are perhaps the most important of all—develop progressive myopia.

A special committee of the American School Hygiene Association fixes the maximum time for the uninterrupted use of the eyes for near work at fifteen minutes for the first school year, increasing to one hour in the later adolescent years.

Again, the undeveloped condition of the eye in the early years, the frequent lack of ability to fuse together the images

from the two eyes, the inability to hold the book at proper distance from the eyes because of the shortness of the arms, these and other facts indicate that instruction in reading should not begin too early. The British committee recommended that extended reading from books be postponed until the age of seven at least. Oral work, pictures, blackboard work, and wall charts are recommended for use up to this age.

The "make up" of school texts is important. Authorities are practically agreed as to the fitness of the following requirements:

Paper should be white, without gloss, opaque, and sufficiently hard so that type does not press through.

Illustrations should be plain and without fine detail, especially in the lower grades.

Ink should be good black and evenly distributed over the page.

Maximum length of lines should be 90 mm. (The British committee gives 100 to 93 mm.—3⅔ to 4 inches.)

For beginners, lines should not end in the middle of a word.

Series of short lines by the side of illustrations should not be used.

Margins should be sufficiently wide so that the eye does not swing off the paper, and those next the fold of the book should be wide enough to prevent printing from being hidden by the curvature of the paper.

Type should be clean-cut, making lettering with clear and well-defined lines, especially in the upper half, and whites and blacks should be evenly balanced. Italics should be used very little.

The committee of the American School Hygiene Association gives the following as minimum standards for type, spacing, and leading for the earlier school grades:

A. First grade—

(i) The height of the small letters should be at least 2.6 mm., with the other dimensions in proportion.

(ii) The width of the vertical stroke should be from .4 to .5 mm.

(iii) The space within the letters should be from .8 to .9 mm.

(iv) The space between the letters should be about 1 mm.

(v) The space between the words should be about 3 mm.

(vi) The leading should be from 4 to 4.5 mm.

B. For the second and third years the standard may be reduced slightly, but the letters should not be less than 2 mm. in height and the leading should be 4 mm.

C. For the fourth year height and leading should not be less than 1.6 mm. and 3 mm. respectively. It would be better to retain the standard of the fourth year through the sixth year.

The British committee is somewhat less liberal in its recommendations for size of type, but more liberal as regards leading, or interlinear space.

(5) But, after all, standards and objective material are but means to an end. These are furnished and should be properly used in order that the child may *learn to read*. And reading is to interpret symbols presented. It is something psychological, a series of mental processes. A fifth and perhaps most important demand of hygiene is therefore that reading should not be detrimental to the mental health of the child.

Now, the earlier years are the time *par excellence* for play, for telling of stories, and for relating personal experiences, all of which begin the development of and furnish the basis for habits of attention, ability to concentrate upon essentials while ignoring unessentials, practise in memorizing things of interest, and in giving logical expression to ideas—all essentials to mental health, as outlined in the preceding chapter. On the other hand, as Doctor Fitz has pointed out, reading too early is liable to crowd out these activities and leave the child grinding over the memorization of symbols that are arbitrary and uninteresting. He develops the habit of looking too much *at* the symbols, not *through* them, to the thought —a habit which may retard him in his future reading when the getting of the thought is essential.

The statement may therefore be repeated here with emphasis that regular work in reading should not be required of the child in the early years. Many of the best educators maintain that reading should be postponed until the age of eight. To quote Doctor Fitz:

Experience has shown, over and over again, that the child who begins to read at eight years is in no wise handicapped in his later educational progress. He has the inestimable value of the advantage of intense interest, rounded by his sense of power in unlocking the secrets of books and papers after the fashions of his elders. Increased maturity makes the slow, irksome task pleasurable and easy.

The slower association time of the child makes it wrong to demand too rapid reading, especially when the material is new and unfamiliar. Ideas that should be associated with the symbols come slowly and attempts to force them are liable to cause either wrong associations or interference.

To summarize briefly, then, the reading of books in the school should not be required under conditions that are liable to cause bad posture or to result in injury to the organs of speech or of vision; books themselves should not be media for the spread of disease; and finally, instruction in reading should be given neither at such an early age nor by such methods that it may become a hindrance to mental development and the formation of good mental habits.

Arithmetic.—As one of the "three R's" arithmetic has always had a place of great importance in the schools. Its general hygienic requirements are much the same as those for reading.

The great amount of desk work that must be done necessitates attention to the proper adjustment of seats and desks with a view to securing good posture. Height of blackboards from the floor also should correspond to the size of the pupils.

Care of the eyes makes it necessary that proper conditions of lighting be furnished and that the "make up" of texts conforms to all the requirements given in the preceding section for reading-books in general. Special emphasis should be placed upon the requirement that diagrams and illustrative drawings be clear and that all figures, especially fractions, be in large, good type. The British committee would have all mathematical symbols in slightly larger type than other material. Blackboards should be of proper color and of good

material, and lettering to be read by pupils in the room should be sufficiently large and clear to be read without difficulty or eye-strain.

With a view to taking precautions against spread of disease the use of slates may well be prohibited entirely, also the loaning of pencils among pupils. Crayons should be selected with care and pupils should be taught how to erase the blackboards properly in order to avoid as far as possible filling the air with dust.

From the view-point of the child's mental development a number of things are significant. First, the age at which formal arithmetical study begins should not be too early. The power of abstract reasoning develops late, as was stated in the preceding chapter. Attempts to force its development at too early an age are liable to result in retardation or arrest. Doctor Triplett has shown that too much stress on arithmetic in the early years often results in bad mental habits, such as the incessant counting habit known as arithmomania or the fixation of incongruous "number forms" which are liable to persist as obstructions to logical arithmetical thinking. A number of the best authorities maintain that arithmetic should be postponed until the age of eight or ten years. Finally, bad attitudes may be the result of too early stress upon the subject. Says Doctor Fitz:

> . . . Much of the aversion to arithmetical problems found later is undoubtedly due to the disheartening drill of this primary work. Here again the child who begins arithmetic at eight or ten years of age finds himself able to take it up quickly and has the liking for it that easy mastery always gives.

Again, collected statistics show that from one-sixth to one-fourth of the time of the school is devoted to the study of arithmetic—an amount entirely out of proportion to the value of the subject for mental development. Courses are as a rule made to include too much. Topics are taught because found in the texts and they are in the texts because

they have always been in other texts before. The result of all this is, in many cases, overpressure, nervousness, and injury to mental health and development.

A number of mental processes are involved in arithmetical work. Much would be gained for the hygiene of the subject if this were recognized in a practical way. For example, where mere association of ideas is involved, account of the fact should be taken and drill in formation of the proper associations should always precede drill for speed. Or, again, much of the subject is merely application of a new form of expression, a new language, to a form of reasoning with which the pupil is already familiar. Thus, both ratios and common fractions are neither more nor less than unexecuted divisions, decimals are specialized fractions written in new form, and percentage is perfectly simple when treated as a subdivision of decimals with symbol series of its own. Doctor McDougle has emphasized the proper sequence and proper relationship of these topics for the pedagogy of the subject. The hygienic value from such a procedure would perhaps be even greater, eliminating innumerable difficulties of thought and causes of interference and unhealthful attitudes. Doctor Burnham has emphasized the importance of eliminating the type of complex problem which is in its essentials a logical trick and has little to do with reasoning about numerical relations.[1]

Geography.—The demands of hygiene upon geography, in so far as its influence upon physical health is concerned, have particular reference to posture and to vision.

In case of the former the conditions within the schoolroom and the hygienic demands are practically the same as in case of reading, except in the special work of the drawing of maps. There the rules found under the discussion of drawing will apply. It may be added, however, that map-drawing should not constitute a large part of the course.

[1] See also Jessup's studies of eliminations in arithmetic in the 1915 year-book of the National Society for the Study of Education and in the 1914 and 1915 Proceedings of the National Education Association.

As regards the care of the eyes, also, the general rules indicated in the discussion of reading apply. In addition to these, however, some special precautions are made necessary by the extensive use of maps. First, the matter of the construction of maps is of importance. They should not be made to contain too much of detail, and should only contain such lettering as is necessary to make their meaning clear. The suggestion of Burgerstein that all the important names in wall maps be large enough to be read by the entire class is good. The special committee of the British Association for the Advancement of Science recommends that no school-atlas should use type smaller than eight-point, with a minimum height of short letters of 1.2 mm., and that for children below the age of nine years nothing below ten-point, with a minimum height of short letters of 1.6 mm. ($\frac{1}{16}$ inch) should be used. Separate maps should be used to represent physical and political characteristics. As regards the use of maps a suggestion of the British committee may be quoted:

> Location by reference lines should be taught from the beginning, and children should not be allowed to hunt for a name in an undirected fashion, as they may thus have to read fifty names in finding the one sought.

In a more general way, geography may be said to be a subject of health opportunity. Outdoor excursions and trips to places of interest may do much for the general health of the pupils and are to be encouraged.

From the view-point of mental development, also, geography may be said to be a study of opportunity. Pedagogically, the aim is to teach of the earth as the home of man. If this is done properly, with the use of concrete material wherever possible and with many properly managed outdoor excursions, the child comes into possession of a wealth of concrete ideas which, as investigations have shown, are so often lacking in school-children but which are essential to proper mental development.

On the other hand, investigations have shown that unless special care is taken in the use of such material as charts, maps, and globes there may develop peculiarities and bad mental habits which may persist as obstructions to clear thinking. "When I get big I am going to move into *that* State, 'cause there the grass and flowers and trees—*everything* is all *pink*," confided a small boy to his teacher as he pointed to a bright spot on the map before him. This is a typical case. Doctor Triplett reports that 110 individuals asserted that map-drawing had produced inability to image places on the earth, a map being called up instead. One student reported as follows on the result of four years of study of geography, supplemented by much practise in locating places upon a large colored map:

> . . . In consequence I still think of all States as little patches of green, red, or yellow, as the case may be. That result I do not regret so sorely, for it is a common thing. But, worse than all, the map was hung during all those years upon the south wall of the schoolroom. This reversed all the directions and I still think of Washington State, for instance, as being southeast of here, Florida as being northwest, etc. It would be almost impossible for any one who had not had a similar experience to imagine how very strong this association is.

Speaking of such cases as "arrests" and commenting upon their causes and the form they take, Doctor Triplett writes:

> . . . The prevalent idea that one must be able to locate every place, whether of consequence or not, on the ground that it may be needed in one's reasoning appears responsible for the close memory grind of insignificant details. Overemphasis on the study of map-drawing is without doubt the strongest element in the production of the effects characteristic of these arrests. A large majority being of the visual type, extreme concentration on a symbol during the most plastic period of life habituates to the use of the fixed mental images of maps, globes, etc.

Maps should be used to aid in the instruction of pupils concerning the things they represent, not merely as subject-

matter, to be learned as they stand; map questions should be used only in reviewing and summarizing, never in introducing pupils to the study of a country, except in the most general way; and care should be taken always to see that the ideation of the pupil reaches beyond the map to the actual things it represents.

Writing.—The most important phases of the hygiene of writing, in so far as physical health is concerned, have reference to its influence upon posture, vision, and the development of muscular control.

The necessity of good seats and desks of the proper size for the purpose of securing good posture is self-evident. As regards other requirements, possibly a brief summary of those enumerated by Doctor Burgerstein would be of most value in this connection. They are as follows:

(1) Body erect, without bending to the side and without a twist in the horizontal axis, and with breast not touching the edge of the desk.

(2) Head very slightly inclined, eyes being as far from the paper as height of the body in good position will allow—never less than thirty centimetres.

(3) Feet neither crossed nor drawn under the seat, but with soles resting on foot-rest or on the floor.

(4) Arms held so that elbows are about a handbreadth from the body, forearms with about two-thirds their length on the table and almost at right angles to each other.

(5) Hand with palm turned slightly to the left and resting upon the nail of the bent little finger, upon which the other fingers are supported, one above the other.

(6) Penholder, which should not be too short, should not be grasped too near the pen; held with upper portion pointing toward the elbow.

(7) Writing periods to alternate with rest periods, gymnastic exercise, or oral instruction whenever the majority of the class begin to show signs of fatigue.

(8) Copy-book so placed that it is in front of the median line of the body; lines parallel to the edge of the desk in vertical, but slanting upward to the right for slant script.

Proper attention to vision makes necessary the following requirements:

(1) Well-recognized rules for lighting should be observed.
(2) The use of slates should be prohibited.
(3) Writing-paper should have a good surface, being neither rough nor glaring, and should not be so transparent as to allow script to be visible through it.
(4) Ink should be a good black.
(5) Guide lines on the paper should be of a good black, never light blue, as is often the case, and should not be complex.
(6) Script should not be too small—small letters not less than three to five millimetres in height, according to Burgerstein.

Some care should be taken for the neuromuscular development. Here may be mentioned the following:

(1) Strenuous drill in writing should not begin too early, as it requires too much of the accessory muscles. If reading should be postponed until eight years, writing should be postponed until even later.
(2) Script should be plain, without flourish, and should not be too small.
(3) Pencils and penholders should be long and sufficiently thick to be grasped with ease.
(4) Copy-book lines should not be too long. In fact, books should not be used, a few sheets of paper of proper size being better.
(5) The necessity for frequent periods of rest needs re-emphasizing here. Prolonged strain due to too much writing may result in what is known as "writer's cramp."
(6) When first beginning to learn to write, children should be allowed to use coarser material, such as blackboard and chalk, thus avoiding the fatiguing finer adjustments of hand to pencil, etc.

Lack of space prohibits going into the controversy of vertical *versus* slant script. On the whole, it may be said that investigations seem to have indicated that, from the view-point of influence upon both vision and posture, the advantage is with the former, but the present semi-slant systems may easily be used without sacrifice of posture if teachers use "never-failing watch and care."

So far as mental development and health are concerned, the

problems of learning to write are those of association of the idea with the proper writing movement to produce the symbol and of the formation of habits. It should be emphasized here that learning correct forms should precede drills for speed, and that right habits should be mechanized as rapidly as possible, thus reducing the probability of interference of association.[1]

Drawing.—Properly employed, drawing may be a very healthful exercise. Like writing, however, a number of precautions are necessary regarding it.

General precautions are those against injury from poisonous colored crayons, the use of sharp thumb-tacks, or any other material that might be injurious. Aside from these, the hygienic requirements are very similar to those of the hygiene of writing.

Hygienic chairs, tables, and other furnishings are necessary to good posture. Other special requirements are given in the theses prepared by a committee of the Berlin ***Lehrverein***, the main points of which are here enumerated:

(1) Upper part of the body free and without strain, head inclined slightly forward, shoulders equal height, feet separate with soles on the floor.

(2) Drawing surface directly before the middle line of the body.

(3) Left forearm pushed forward on the table so that the lower part of the upper arm lies just over the surface yet so that the body may not be supported by it. Left hand holds drawing surface lightly.

(4) Right forearm neither pressed close to the body nor used as a prop, but placed to make possible good free movement.

(5) Right hand lightly supported on the point of the little finger. Wrist not touching surface of paper. Hand should not obscure the line that is being drawn.

Proper care of eyes makes necessary these requirements:

(1) Good conditions of lighting.

(2) Use of white or yellow paper with good surface.

[1] See Freeman, "The Teaching of Handwriting."

(3) Prohibition of drawing—especially such as map-drawing—for home work.

(4) Refraining from use of fine lines and fine shadings.

(5) Tests of vision, including color tests, before beginning technical drawing.

(6) Frequent changes from near to far vision, such as is required in drawing from models.

Regard for the child's motor development makes it desirable that overstrain from too long periods, from use of too short or too slender pencils, drawing of too fine lines, etc., be avoided. In all the early years drawing should be free-hand, and the materials should not be too fine. Technical instruction should be postponed until near the pubertal period.

So far as its relation to mental hygiene is concerned, drawing is of great value as a means of expression, and normal expression is a condition of development. The spontaneous drawing in the early years should therefore be encouraged. Artistic expression and appreciation is a later development and should not be insisted upon in the prepubertal period.

Spelling.—Outside the school one is rarely called upon to spell words except when expressing his thoughts in writing, and, especially, in letter-writing. The chief aim in teaching, therefore, should be the association of the proper letter symbols with each other and of these with the proper writing movements.

From either view-point, pedagogical or hygienic, it is essential that these associations be direct and that the habituation of the writing movements be carried to such a degree that they will come as little as possible into consciousness to obstruct the free flow of ideas. In brief, learning to spell should not become the cause of interference of association.

For securing the results aimed at, several general principles may be laid down:

(1) Wherever possible, make spelling secondary to some other activity. For example, in the early grades especially spelling should

be taught incidentally, along with other subjects. The act of spelling is thus not made an end in itself, and the danger of too much "symbol consciousness" is reduced. Special drill classes may well be postponed until about the fourth school year.

(2) Differences in type of mental imagery make it necessary that several methods be used, appealing to visual, auditory, hand-motor and speech-motor imagery, etc.

(3) Investigations of the most economical employment of time seem to indicate that about fifteen minutes per day in the upper grades is all that may profitably be spent in column drill.

(4) Avoid showing the child incorrect forms. Correct errors by showing the *right* spelling. Never strengthen the imagery of the wrong form by making it prominent.

(5) Teach homonyms separately, thus avoiding the dangers of interference of association.

(6) Finally, make the habits of writing whole words with one impulse of the will mechanical as rapidly as possible. Methods for doing this are: copying, writing from dictation, rapid writing of familiar material, such as poems, etc. With attention fixed upon the thought or the words, the matter of spelling is left more and more to the hand.[1]

Other Subjects.—Limits of space make it impossible to extend the list of special treatments further. Possibly the treatments here given will be sufficient to illustrate rather fully the application of the principles which were pointed out in the preceding chapter. Some of the other subjects that should be rightly included are:

(1) *Music*, the essential hygienic considerations in which are attention to vision, to care of the vocal organs, especially at time of voice mutation, and to the development of neuro-muscular powers where the use of instruments is involved;

(2) *Language*, in which the most important problems are those of association of ideas and formation of habits;

(3) The more scientific subjects, which properly should be begun rather late, but which require special attention to the requirements of mental hygiene.

In any specific case the problem will be the application

[1] See investigations by Ayres, Buckingham, Ballou, O'Shea, and others.

of the general hygienic principles laid down in Chapter XXX. These will never be found to conflict with sound psychological and pedagogical principles. Freedom of expression, correct habits of attention, orderly association, a lively interest in the work at hand, all are vital to both health and growth. They constitute the magic which the pedagogist must use in order not merely to preserve from injury, but to transform the immature individuals daily thronging our schools into the master minds who will solve the problems of the future.

IV. THE TEACHING OF HYGIENE

CHAPTER XX

THE TEACHING OF HYGIENE IN ELEMENTARY SCHOOLS

I. **The Importance of Hygiene in the Elementary School Curriculum.**—The watchword of the present day is efficiency. The idea that our future welfare and prosperity depend on the conservation of our resources is fast gaining ground in America. The modern scientific conception of efficiency, which was born amid the needs of industry, is now being successfully applied to almost every field of human endeavor. Quite recently, however, we have begun to realize, as never before, that efficiency must begin with the health of the individual and not with knowledge and action. Ill health is now being looked upon as a great economic waste, and means are being taken to prevent it. Numerous insurance companies, for example, have appointed physicians and nurses whose business it is to keep the policy-holders well. Many industrial concerns, moved more by the idea of efficiency and economy rather than by a feeling of sympathy, have found it worth while to provide free medical attendance as well as high-class sanitary measures for their employees. As psychology and hygiene become more and more scientific it becomes clear that knowledge, skill, morality, the satisfying of all the worthy satisfactions of life, depend largely on health. In the light of such a growing conviction it is obvious that the three R's must recede to the background in their order of

importance. It is immeasurably more valuable to be healthy than to know how to diagram English sentences, bound Africa, or write a promissory note. The healthy boy or girl working under hygienic conditions is able also to do more school work and do it better. Hygiene must then be regarded as the *most important subject* of the *curriculum*. President G. Stanley Hall has well said: "What doth it profit a child if he gain the whole world of knowledge and lose his own health?" We might well ask now: "What is the present status of this important subject in the elementary schools?"

II. **The Failure of Health Instruction in the Grades.**—That the health instruction in the public schools has improved within the last few years is not to be doubted; but its effectiveness is still to be questioned. Doctor McMurry, a member of the Hanus Commission which investigated the schools of New York City, found that the health instruction was wooden and far from practical. Rapeer, who made a careful investigation of the educational hygiene in twenty-five leading cities, says of the teaching of hygiene: "And yet the subject is a tail-end subject, little emphasized, and furnished with poor text-books for the most part, and very frequently with poor teachers in the grades and high school. Colleges do not usually give credit for nor demand a knowledge of this vitally essential subject of health and how to get and maintain it, much to their disparagement, and consequently we find many schools almost entirely neglecting it." These two investigations reveal conditions that most educators would probably agree are typical of the whole country.

The writer wishes to propose the following *reasons for the failure in the teaching of hygiene in the grades below the high school:*

(1) The teachers as a class are not well prepared to teach hygiene. The training received in the normal schools has too often emphasized anatomy and physiology rather than hygiene, and little or no time has been devoted to it in the regular normal-school course. As a result the teachers are

deficient in the right kind of knowledge. They have not yet learned to appreciate either the importance or the character of efficient health instruction.

(2) The psychology and pedagogy of hygiene have not as yet been worked out, because hygiene is really one of the newest subjects in the curriculum. The disadvantage connected with the teaching of hygiene rather than arithmetic is obvious when one considers the splendid devices involving play and construction and the standardized subject-matter now in use in the teaching of arithmetic and the dearth of these devices and standards in the teaching of hygiene.

(3) Many of the text-books still in use devote altogether too large a proportion of space to anatomy and physiology. Much of the material in these books is too difficult for children, and in some cases the way in which it is presented leads to prejudice against any further study of the subject. The writer has known of cases where the children referred to lessons in hygiene as "nasty." Such an attitude can scarcely be expected to inspire a love of health or result in hygienic practises. Fortunately, however, there are a number of good books on hygiene that have recently appeared that could be put into the hands of children with profit.

(4) The hygiene that has been taught has been too general and abstract and has aimed at knowledge rather than health ideals and practise. For example, teachers often spend much time on the anatomy and physiology of the digestive system to the neglect of such vital topics as food values, the hygiene of eating, how to preserve food, how to keep it from becoming contaminated, the right kind of breakfasts for children, a good kind of lunch to bring to school, etc.

(5) The instruction in hygiene is not well organized or standardized through the grades, hence repetition and tedium both for teachers and for pupils are common. There is also a common neglect of essentials.

(6) The aims in teaching hygiene have not been clearly formulated. Few principals of the elementary schools have

clearly in mind what results they ought to get by the time the children get through the eighth or ninth grade, consequently there has been little systematic planning for results.

(7) The teachers frequently do not like to teach hygiene. It is only natural to expect that such vagueness as to aims, values, and methods tends naturally to dull the teacher's zeal, spontaneity, and efficiency. She realizes her failures in teaching hygiene, has a hearty dislike for it, and slights the subject whenever possible. In short, the psychology and pedagogy of hygiene are still crude and unsystematic.

This chapter is written with the idea of helping hygiene to find itself by suggesting some principles for guidance. The brevity and scope of the chapter make some of these assertions sound dogmatic. At best they can be regarded only as tentative. The old-fashioned instruction has been a failure. We must have a programme for further experimentation and advance.

III. **Fundamental Facts and Principles Involved in the Teaching of Hygiene.**—It is the belief of the writer that methods of teaching hygiene should take into consideration the following facts and principles:

(1) *The fundamental aim in teaching hygiene should be the inculcating of the ideals and habits necessary for health rather than mere knowledge.* It is better to have the habit of cleaning one's teeth than to have all the information on the teeth that is available. To make the instruction in hygiene really effective the teacher should have a good knowledge of the psychology of habit formation, and how to apply it. Whenever possible, the instruction should be correlated with action. If, for example, the teacher wishes the children to clean their shoes before entering the schoolroom, she should see that a place is provided for that purpose, and she must then insist that the shoes be cleaned until the habit has been gained. If she wishes the children to hang their wraps on individual hooks, she must first see that there is a hook for each individual child and that he knows where it is. She must then

see that he hangs up his wraps regularly until the process has become "second nature" to him. While it is true that practise is more important than knowledge, yet the function of proper knowledge in promoting action should never be overlooked. Whatever may be said in disparagement of knowledge, it is nevertheless plain that it helps rather than retards the right kind of practise.

(2) The child has little or no appreciation for health as a motive for future action. In the stirring dramatic world in which he lives there is almost no inclination to consider the remote consequences of his behavior on health. To say to the small boy, "Now, Johnny, if you do not get plenty of fresh air you will not be strong," has little or no effect on Johnny. He is concerned with his immediate world and not with the problems that he is likely to have six months or ten years hence. Minor illnesses, which might be expected to serve as motives for action, are soon forgotten, and it is doubtful whether the more serious ones offer anything more than specific motives. The boy who is dangerously ill because of the eating of green apples may be forever cured of such action, but such an experience would not deter him, probably, from overeating generally. The child who catches cold as a result of neglecting to remove his wet clothing may of his own accord promptly change his wet clothing in a similar situation, but such an experience would not insure his taking plenty of exercise in the open air.

(3) Health being inadequate as a motive, one of the teacher's great problems is to discover motives that will be effective. What is going to happen in some far-distant time does not interest the child in the least. The younger the child, the truer this is. All the instruction must centre around the child's needs and interests. The child is interested in the approval of the teacher, in activity, play, competition, and imitation.[1] To such instinctive sources the teacher must turn for the forces which will assimilate her instruction and

[1] See Thorndike's "Original Nature of Man."

make for action. To illustrate, a child may have no desire to keep his desk neat and clean, but if there is competition among the pupils of a school he is likely to develop a new interest in the appearance of his desk. Little children are naturally interested in playing at keeping house, having teas, etc. Teachers in the kindergartens and lower grades may easily divert these impulses into habits of school housekeeping and personal hygiene, such as dusting, setting the table, preparing lunches, use of napkin, proper chewing of the food, cleaning the teeth, and keeping the room free from flies.

(4) Activity, mental and physical, is one of the essentials for health. The first law of the child's nature is action. Every stimulus around him moves him to act. There is little use in telling children about the great need of exercise. The problem is to give the children plenty of opportunity to exercise so that this tendency may not atrophy. It needs also to be directed along the right channels. If the teacher gives the child opportunity and stimulus to express his playful activities in the schoolroom and the playground, she will have accomplished more than would have been possible through any amount of formal instruction. A permanent interest in physical activity should be one of the goals of health instruction. It is doubtful whether the work in physical culture in the elementary school has contributed much, if anything, to such an interest.

(5) The structure of the body—something which the child cannot see and a knowledge of which is not necessary for the solution of his immediate problems—is not very interesting. Before the child leaves the grades he ought, of course, to have some kind of common sense and scientific knowledge of how his body is made and how it works, but such knowledge should generally be free of technical terms, and should in every case be presented to satisfy his curiosity or to support his knowledge and practise of hygiene. The Gulick "Hygiene Series" (Ginn & Co.), for example, presents

in an interesting manner all the anatomy, physiology, and hygiene that the child needs to know.[1]

(6) There is grave danger in isolating the instruction in hygiene so that the child is led to think of hygiene as coming at a certain time of the day but having no further relation to his life activities. The teacher should seize opportunities in other lessons to give information in hygiene, and whenever there is occasion in the play or work of the pupils. Especially desirable is individual instruction when it is needed. The teacher who advises a pupil who is anemic to walk to school rather than to ride in a closed car, and who afterward follows this up to see that it is done, has no doubt accomplished more for the good of the child than would have been possible through any given class instruction for a year. In caring for children who have wet feet, in supervising the warming and eating of lunches at noon, in advising children who have colds of the best methods of treatment, the teacher may work most effectively.

(7) In matters pertaining to hygiene, children should be taught and be led to act socially for the good of the group. To obey the laws of health is desirable not merely for one's own sake but for the good of others. Mere word knowledge about such things is largely worthless unless children live it in the home, school, and community. For example, children may and should be taught that there is danger in catching or communicating a disease through the common drinking-cup, but in addition to this the teacher must see that individual drinking-cups are provided and used. Every teacher should be able to teach children how to make a drinking-cup out of a piece of paper.

(8) Instruction relative to the effects of tobacco and alcohol on bodily health has probably accomplished but little.

[1] O'Shea & Kellog's Health Series, and Coleman's "The People's Health" (Macmillan); Tolman's "Hygiene for the Worker" (American Book Co.), and Richard's "Hygiene for Girls" (Heath) are more recent texts of the new order.

These topics when considered in the upper grades should emphasize particularly the economic and social loss to the person who has these habits. To tell boys that good football-players do not smoke, and that nobody who drinks can be an engineer or a conductor, is probably more effective in influencing action than to show the boys pictures of ulcers in the stomach due to the excessive use of alcohol. The most common arguments against temperance and total abstinence should be exploded by the presentation of scientific facts based on economics, good taste, and hygiene.

(9) While a knowledge of sex hygiene is desirable for children, the ordinary teacher who has had no special scientific training, and has little or no sympathy with the matter, is not at all fitted to teach the subject with success, and the probability is that she may do more harm than good. The proper place for this instruction is in the home. Teachers should lend their influence toward the distribution of good literature on such instruction to parents, and toward the encouraging of meetings of parents where such matters can be talked over. Moreover, as more skilled teachers of nature study and biology are added to our schools, and as principals gain more scientific knowledge along those lines, the school may gradually meet these needs that are at present not satisfactorily met by all the homes. The present study and experimentation in this field promise much in the direction of increased socialization of the school.

(10) Instruction in hygiene, to become effective, must plan to make pupils personally responsible. This responsibility cannot be expected unless the pupils are trained in habits that make for health. The school life of the child offers many opportunities for cultivating the right kind of action. Let us take a single example. Children who eat their midday lunches in the schoolroom are likely to leave much of the remains on the floor and desks. The teacher should insist on food remnants being properly taken care of until finally, through pupil organization if necessary, pupil

responsibility is assumed.[1] A schoolhouse and grounds that have been planned from the point of view of hygiene make it easier, of course, for the teacher to inculcate the right kind of habits. A poorly lighted, badly ventilated schoolroom, furnished with non-adjustable seats, and a muddy schoolyard do not make for good habits. An investigation of the rural schools of Worcester County, Mass., conducted by the State Normal School at Worcester, shows that the hygiene and sanitation of these schools are deplorable. More extensive investigations, like the Ohio, Wisconsin, and Vermont school surveys, show that these conditions are common. But even under the most unfavorable conditions the ingenious and intelligent teacher can devise many ways for training the children in good habits. Floors may always be swept, furniture dusted, the window-shades adjusted, and the heating and ventilating in some measure controlled.

(11) In the selection of subject-matter, stress should be laid particularly upon the most important health problems of the community. The teacher in the rural schools should lay particular emphasis on topics in rural hygiene such as "The Danger of Infection from Surface Water, Springs," etc. A teacher in city schools would find topics like "Why It Is Better to Walk Short Distances Rather than to Take a Car" and "The Danger from a Leaky Gas-Tube," etc., more valuable. One way of getting at these problems is to study the health needs of a given community, matters relative to water-supply, sewerage, etc., and how they are being met. The board of health of the community can frequently render valuable assistance by showing groups of pupils or teachers what are the unmet health problems of the community and what they can do to help in their solution.

(12) The education of the children in hygiene demands the active co-operation of parents. Children cannot be made healthy through the mere training and instruction in hygiene given in the grades. The sanitary and hygienic conditions

[1] See Scott's "Social Education."

necessary for health must be supplied at home as well as at school. Hygienic habits, if they are really to influence the health of the children, must be not merely school but also home habits. School principals and teachers must see that the parents are enlightened as well as the children. The parent-teacher association movement which is now becoming so popular ought to be an excellent way of bringing parents and teachers together to co-operate for the health of the child. In such meetings physicians and nurses might be called upon to talk to and with parents on home hygiene.[1]

(13) The practise of hygiene should be fostered and approved in much the same way as any of the required and important work of the school. The teacher praises the child for excellence in arithmetic or geography and gives him a high mark on his report-card. Should not practise in hygiene be praised and marked in the same way? The practise of hygiene is of fundamental importance and it should have equal opportunities for success with the other subjects of the curriculum. I realize that this suggestion is radical and that our system of marking is defective; nevertheless, I believe it would be a means of improving hygienic practise.

IV. **Methods of Teaching Hygiene.**—(*a*) *Incidental.*—As previously suggested, we need to judge the results of the teacher of hygiene largely by the habits which she has been able to inculcate. In one sense the schoolroom, the school grounds, and the home are to be considered as places for the practise of hygienic habits. Every opportunity that the teacher has to help the child to form the right kind of habit should be eagerly seized. It is quite absurd to think of different habits, all important to health, being taken up in certain grades in a mechanical fashion and then being allowed to drop. It is not sufficient to mention cleanliness in one grade, or to make a great crusade for cleanliness at this time, and then let it drop and begin on another habit in the next

[1] Professor W. H. Heck, "Parents' Part in School Hygiene," *Educational Review*, February, 1914. See also Appendix II.

grade. It is well to remember, too, that there is no general habit of cleanliness. A child may have clean teeth and not have clean finger-nails. General cleanliness is gained only through the practise of specific habits of cleanliness and the development of propulsive health ideals.

Instruction in and practise of habits necessary for health should take place as soon as the child enters school. In most cases this instruction should be incidental and individual. In some cases, as in the cleaning of the teeth, class instruction should be given and tooth-brush drills inaugurated. As soon as the habit is being practised regularly, nothing further need be done except in individual instances. Sometimes the entire school may come from homes where they are taught to clean their teeth regularly. In such circumstances the teacher would not, perhaps, find it necessary to give the matter much consideration. When lessons are given in the lower grades they should be brief, simple, and in a conversational tone. The first four grades should centre their forces on getting children to form essential habits and, eventually, on making the pupils responsible for them. Reading and a more systematic treatment of the subject should come in the higher grades.

Among the many good habits which the teacher should supervise to a certain extent in the school are: (1) cleanliness of body and cleanliness in the schoolhouse and on the school grounds, (2) cleaning the teeth, (3) ventilating the schoolroom, (4) assuming correct postures, (5) correct breathing, (6) cleaning shoes before entering the schoolroom, (7) correct use of the voice, (8) right use of the eyes, (9) care of hair and nails, (10) use of individual drinking-cups, pencils, and other materials, (11) dusting school furniture, (12) cleaning blackboards, (13) use of the handkerchief, etc.

There are also some bad habits which should be discouraged, such as (1) putting things into the mouth, (2) expectorating on the floor, (3) biting nails, (4) thumb-sucking, (5) "swapping" gum, food, etc., (6) coughing in another's

face, (7) kissing on the lips, (8) carrying soiled handkerchiefs, (9) picking the nose, (10) licking the fingers in turning the pages of a book, (11) reading in a dim light, (12) rubbing the eyes, (13) putting foreign bodies into the ear, (14) cracking nuts with the teeth, (15) overeating, (16) eating when tired, (17) using another person's brush, comb, towel, drinking-cup, (18) wearing wet clothing, (19) bandaging a cut with a dirty cloth, (20) wearing shoes that are too small, (21) negligence in bathing, (22) getting wet feet, etc.

In the upper grades, say beyond the fourth, it is to be hoped that less and less effort will be necessary on the part of the teacher as the pupils assume more and more the responsibility. Incidental instruction, however, will always be necessary.

Even if pupils practise certain habits while at school, it does not necessarily follow that they will practise them at home; and then there are many habits, such as sleeping with the window open, that cannot well be practised at school. The teacher may advise children, ask them to report, or possibly confer with the parent to get the child to act. The deep-seated prejudice and ignorance found in many homes interfere greatly with the teacher's success in this direction. Often she can do little but give advice and hope that it will function. All associations which bring teachers and parents together to talk over common health problems should be encouraged.

The teacher in co-operation with a school physician and nurse may accomplish a great deal to make parents feel a sense of responsibility. As the school physician is not in direct contact with the children and carries certain authority because he is a physician, both the children and the parents in many cases are more likely to respond. If they do not, a school nurse may be sent directly to the home to advise the parents and to see personally that the children have proper care. To make the work of the school physician and school nurse effective, however, the teacher's intelligent co-operation

is necessary. She must be quick to see that there is something wrong and refer the case to the physician. The result in most cases is likely to further the interests of school work. Often it is backwardness in school which suggests that there is something wrong with the health of the child. When that is corrected, the school work almost invariably improves. Whenever a child is backward without any apparent cause, he should always be turned over to the physician.

The Massachusetts State Board of Education has issued a pamphlet which should be very helpful to teachers. The general symptoms which would justify sending a pupil to the school physician, according to this pamphlet, are as follows: (1) emaciation, (2) pallor, (3) puffiness of the face, (4) shortness of breath, (5) swellings in the neck, (6) general lassitude and other evidences of sickness, (7) flushing of the face, (8) eruptions of any sort, (9) a cold in the head with running eyes, (10) irritating discharge from the nose, (11) evidences of sore throat, (12) coughs, (13) vomiting, and (14) frequent requests to go out.[1]

All educators and physicians now realize, I believe, that the teacher should not attempt to diagnose a trouble; she should be able to recognize, however, that something is wrong. Normal-school students as a part of their professional work in hygiene should study the different ways in which they can co-operate with the medical inspector and nurse. Such a study should include in part the actual observation of the medical inspector and nurse at work, assisting where possible.

Not only should the teacher co-operate with the medical inspector and nurse but she should also co-operate with charitable institutions and the home so that sick or defective children may be properly cared for. As an illustration of the right kind of co-operative effort I quote from the records of the Elizabeth Street School, Worcester, Mass.:

[1] See also list of symptoms given on page 215.

WINTER OF 1912–13

H., boy of thirteen years, anemic, nervous, undersized, with greatly enlarged glands, had grippe which left him with hard cough and in a weakened condition. His school work was so poor the teacher reported the case to the medical inspector, thinking that it might be best to take the child out of school.

A tonic was recommended, milk and fresh eggs were obtained through the Anti-tuberculosis Society, and part-time attendance was permitted for the remainder of the year. At the request of the medical inspector and after a conference with the mother, this boy was taken to the City Hospital. An examination showed tubercular infection in one lung, and other symptoms. By appealing to a charitable organization, an arrangement was made whereby he was sent to the country for the summer.

H. returned to school in better condition than he has ever been in before; is doing good work in class, receiving the last term the best report he ever had.

As a result of conferences with the mother, the boy is now able to sleep with his windows open and be out of doors a good deal. He is examined at intervals by the school physician, who reports that he is now in an excellent physical condition.

Spring of 1914: H. has entered trade school, is in good health and is doing good work.

This is a kind of work in hygiene that counts.

Medical inspection, if it is to further the health of the school-children, must do something besides "inspect." It must follow up cases to see that they are properly treated. The ordinary notice sent to the parent, unless it is followed up as in the case mentioned above, is generally useless. Doctor Storey has demonstrated the value of a "follow-up method" in the secondary and lower collegiate department of the College of the City of New York. This plan of individual instruction in hygiene, Doctor Storey says, proved effective in 90 per cent of the cases. Although there are probably many more obstacles in connection with an elementary school, yet there is no reason why a similar method should not be employed with a great improvement over the present prevalent practise.

Another way of teaching hygiene incidentally, one which is seldom made use of, is to treat in the schoolroom all simple emergencies that arise. This should be done for the sake of the health of the children and to give them some valuable ideas on hygiene. Many children have no idea of antiseptics. If a cut or burn is treated in the school, such information may be given so that it may be remembered. There is no reason why children should not be taught how to bandage a finger or hand. When skill has been gained in doing this in a class exercise, they will then be able with the teacher's supervision to put on a bandage in an actual case of emergency. A simple emergency outfit can be purchased for a slight expenditure. One of these outfits should be on hand in every school-building, especially in a rural school-building where the home and physician are often some distance away. An inexpensive emergency outfit which can be purchased at any good drug-store is indicated below:

EMERGENCY OUTFIT

Bandages, one-inch, for fingers and toes, 30 cents a dozen; one-inch, for extremities, 40 cents a dozen.

Absorbent cotton, 27 cents a pound.

Sterile gauze pads, for use as sponges or as wet dressings, one dozen in a package, 30 cents.

Zinc oxide adhesive plaster, to draw edges of cuts together and hold dressings on, one-half inch by ten yards, 40 cents a roll.

Flexible collodion, one-ounce bottle with brush to apply, 18 cents.

Creolin, Pearson's, one pound, 75 cents. (One teaspoonful in one pint of water makes antiseptic solution.)

Tincture of iodine, two ounces with brush to apply, 10 cents.

Aromatic spirits of ammonia, four ounces, about 25 cents. (For faintness, fifteen drops in a tablespoonful of water. Repeat in five minutes if necessary.)

Carron oil, six ounces, about 20 cents. (Apply to burns.)

Witch-hazel, six ounces, about 20 cents. (For sprains.)

Borax, 5 cents.

Oil of cloves, two ounces, 20 cents.

Rubber hot-water bottle. A common-size glass bottle is as good and far cheaper.

Safety-pins, small and large.
Scissors.
May have in addition:
Essence of peppermint. (One-half teaspoonful in one-half cup of hot water for colic, or a pinch of red pepper in hot water.)
Soda bicarbonate tablets, gr. v. (For sour stomach and vomiting.)
Spirits camphor. (To rub on swellings where skin is unbroken.)
This complete outfit can be purchased at any good drug-store for about $4. If conditions make this expense impossible, every teacher may have a simple outfit to treat cuts, burns, and bruises for a small sum. It should be put into a substantial wooden box and kept under lock and key.
Two books of invaluable assistance to every teacher in dealing with emergencies are: "Emergencies," Gulick, "Hygiene Series," (Ginn & Co.); Barton, "First Aid Text-book" (published by First-Aid Association of America, Boston).

Incidental instruction, which may not be directly related to immediate action, should also be touched upon in other lessons. Health is so related to all the experiences of life that it may be considered in this fashion without a thought of "dragging it in." Let us note a few examples. In history, children should be taught to perceive the progress that has been made in overcoming disease, new discoveries in medicine and hygiene, and the effect of these on society; in civics, activities pertaining to public health, such as the cleaning of the streets, the disposal of garbage, and the prevention of the spread of disease, should be emphasized; in geography, the failure or success of man to conquer his environment through the neglect or practise of modern sanitation is important, such, for example, as the French and American methods at Panama; in nature-study, many opportunities are offered to teach the structure and functions of the human body by comparing man with the plant and animal world. Knowledge thus gained helps to make the child feel the importance of health.

(*b*) *Systematic Instruction.*—It is only fair to ask why, if habit is the real goal of instruction in hygiene, systematic instruction needs to be given. Personally, I believe there is

little place for it below the fourth or fifth grades, and not even in the higher ones unless it centres about the interests of the children. In the upper grades its purpose should be that of supporting the hygienic habits which the children are learning or have learned. It should also give them some sort of an appreciation of health as one of the assets of our civilization. This general purpose of appreciation must be characteristic of much that is taught in our public schools. For example, a large proportion of the children who study about the mining of coal or the manufacture of steel will never make their living in those industries, and coal would burn just as well without any knowledge of how it came into being. A knowledge of both coal and iron does help to broaden the social consciousness of the child. It enables him to see these industries in relation to the needs and achievements of the people.

For a similar reason systematic instruction in hygiene should be given, only in this case hygiene is much more important as a social problem and is something which the citizen can influence to a large extent by his voice and vote and action.

Fortunately, at this time there are a number of good textbooks in hygiene available for children in the grades. Among such books the Gulick "Hygiene Series" (Ginn & Co.) seems to the writer to be most interesting to children. In this brief paper it is impossible to discuss the ways in which such books can best be used. Every teacher should have on hand a few books for ready reference. The busy teacher who wishes to get a general background of physiology and anatomy with their application to hygiene will find Coleman's "Hygienic Physiology" (Macmillan) excellent. A larger and heavier work along the same lines is Hough and Sedgwick's "The Human Mechanism" (Ginn & Co.). Every teacher should have on her desk a good book on school hygiene. Hoag and Terman's "Health Work in the Schools" (Houghton, Mifflin) and Dresslar's "School Hygiene" (Macmillan) are probably the best. Terman's "The Hygiene of the School Child" (Houghton,

Mifflin) is almost indispensable. Ditman's "Home Hygiene and the Prevention of Disease" (Duffield) is probably the best book to recommend to parents.

Besides such material, which may be permanently available, the current newspapers and magazines contain abundant material which the teacher may inject into the lessons. Some of the magazines have excellent pictures in their regular reading columns or in the advertising section, which may be used effectively. In the upper grades the teacher may find it advantageous to have a bulletin-board on which the children may put printed matter of interest.

The tendency in teaching hygiene, as in all other subjects, has been to emphasize the acquisition of mere knowledge. This is, of course, to be deplored. Subject-matter should be selected with reference to its probable power to promote healthy ideals, practical knowledge, and, most important of all, habits necessary for health. In the last analysis the value of the work in hygiene must be judged by the number and value of the hygienic habits which pupils have formed.

V. **An Effective Ideal of Health.**—The psychology of ideals is still a dark chapter in our modern psychology. Many teachers and parents are misled in the belief that mere word knowledge, even when coupled with considerable understanding, functions through ideals. A child may have a good deal of knowledge about the structure, function, and care of his teeth and still never use a tooth-brush. Knowledge is useful in inculcating the right habits but it is insufficient. The idea of the care of the teeth must have back of it a desire to have clean teeth, otherwise the child's knowledge becomes mere formal intellectual propositions. Knowledge presented so as to touch the child's interests and ambitions does frequently function, but our effective ideals probably develop in most cases through habits of action. It is questionable whether many gain the ideal of work after knowing the value of work. The effective ideal of work usually comes through habits of industry. Likewise ideals of cleanliness are acquired

through habits of being clean. The first step toward getting children to develop the ideals of health is to get them to form the right habits. Attractive knowledge of the right kind will, of course, tend to make the practise of the habit easier. The inspiration and example of the teacher, too, are always powerful incentives to habit-formation. Out of these hygienic habits, ably supported by a knowledge of the value of hygienic living, there should grow an effective ideal of health for the pupil who is to be thrown on his own responsibility in facing the problems of life.

VI. **Suggestions for Teachers.**—(1) The conservation and improvement of the health of the children should be your first consideration.

(2) Make the hygiene and sanitation of the school house and grounds as satisfactory as possible.

(3) Try to improve the home conditions under which the children live by getting the co-operation of the parents.

(4) Give the children information incidentally whenever needed. Systematic instruction should be given in the upper grades.

(5) Present information that is allied to the child's interests. If the subject-matter is not in itself attractive, associate it with something that is of interest. Appeal to some incentive that will make pupils anxious to gain more knowledge of the subject.

(6) Teach only the anatomy and physiology that are necessary to enable the pupils to practise hygiene better and to give them a common-sense idea of the structure and functions of the body.

(7) Subject-matter should be chosen with reference to inspiring health ideals and the promotion of the practise of hygiene.

(8) Get children to study the sanitary and hygienic problems of the community and its success or failure in their solution.

(9) Study the individual children to discover any symp-

toms of illness or physical defects. Promptly refer such cases to the school physician, nurse, or parents.

(10) Follow up every case to see that it is properly treated. If necessary, get the assistance of the home or charitable organizations.

(11) Train the children in hygienic habits in the school. Try to get the children to practise specific habits at home by securing the co-operation of the parents.

(12) Get the child to put into practise his knowledge of hygiene whenever the opportunity presents itself.

(13) Carefully supervise every habit in the early stages of its formation. Insist on practise until the act has become automatic.

(14) Plan to make the pupils eventually responsible for the practise of certain specific habits.

(15) In approving or disapproving the child's work in hygiene always consider the practise of hygiene. If you mark the child for his knowledge of hygiene, mark him also for his practise. Practise is more important than knowledge.

A Health Programme for Country Children.[1]—In their efforts to improve hygienic conditions in the schools and in the community, teachers frequently find some assistance in a simply worded health programme or creed for the individual child to apply to his own experience. The following is not intended as a final or exhaustive statement of such a programme, but it is believed that by means of it the rural teacher may be able to drive home certain fundamentals in hygiene and sanitation that will ultimately mean much for good health in home, school, and community and make a direct contribution to the movement for better schoolhouses in the country. It is assumed that the teacher will select such of these items as seem most useful for her purpose and supplement them with illustrative examples from real life.

[1] By Professor F. B. Dresslar, from his government bulletin on Sanitary Schoolhouses and Grounds.

LEST I FORGET

I believe that good health and a strong body are essential, and that the only real wealth is good health. In order that I may be strong and well, therefore, I will endeavor to observe the following rules of health:

1. I will keep my teeth clean by using my tooth-brush every day.

2. I will drink no coffee or tea before I am twenty years of age, and no sort of alcoholic stimulants at any time in my life, unless ordered to do so by a physician.

3. I will chew my food thoroughly.

4. I will sleep at least nine hours each night in well-ventilated rooms winter and summer, or in an open-air sleeping porch.

5. I will bathe my whole body at least once a week and keep my face, hands, and nails clean.

6. I will strive daily to acquire a habit of self-control, habits of anger being not only wrong but unhealthful.

7. I will strive to help make my home as clean and sanitary as possible, especially to prevent contamination of the milk and drinking water.

8. I will do all I can to prevent the development of flies about the house in which I live, since they carry the germs of typhoid fever and other diseases.

9. I will do all in my power to prevent mosquitoes from breeding in or about the house I live in. I will bury or destroy all old tin cans, barrels, or other vessels which catch and hold rain water and offer a place for mosquitoes to breed. I will help to drain all stagnant pools near my home or put kerosene oil on them once every ten days during summer.

10. I will try hard to kill all rats and mice about my home, since they are both troublesome and dangerous, carrying, among other things, the bubonic plague, one of the most deadly of all diseases.

11. I will do all in my power to help secure sanitary toilets throughout the whole neighborhood.

12. I will strive to keep the back yard of my house as clean and tidy as a front yard should be kept.

13. I will take no patent medicine, and will do all I can to teach people that most of it is both useless and harmful.

14. I will keep my personal life clean and pure, for it is a duty I owe to myself and to all who live now and may live in the future.

15. I will take good care of my eyes, taking special pains not to strain them by reading at night or in bad light.

16. I will be careful about spitting, since disease is often spread in that way.

17. I will do all I can to help make our schoolhouse more attractive and to keep it clean and neat at all times.

18. I believe the best investment I can make for myself and my family is to invest in good health, a good education, and a clean moral life.

19. I will strive with all my power to make country life more healthful, more enjoyable, and more beautiful. I believe life in the country is finer and better than life in any city.

CHAPTER XXI

HEALTH TEACHING IN HIGH SCHOOLS

The Need for Teaching Hygiene.—The great Erasmus thought that natural history should be taught in the schools in order that the pupils might understand the allusions in Virgil and the other classic poets to flowers, animals, and other objects in nature. A distinguished medical practitioner a few years ago urged the teaching of physiology and hygiene in high schools in order that "patients might understand their physician better; might tell him better about their ailments when afflicted." Both Erasmus and this modern physician had an eye to direct utility, but it was an illusory utility characteristic of intellectual astigmatism. The reasons for the study and teaching of health in our high schools are as much broader and more fundamental than the reason alleged by the physician as were the reasons for studying natural phenomena broader and more fundamental than the reason alleged by Erasmus. In both cases the real reason is the value of the thing itself.

In the light of the economic and ethical relations of health,[1] its place in education takes on a new significance. Conservation of health is an essential end of education. In the elementary school this end is attained if right habits of living are initiated. In the high school something more is required. High-school pupils should acquire an understanding of basic principles of hygiene, both personal and social; and the organization of health instruction and health practise in the high schools should be definitely to that end. This does not imply that the work of habituating to right living will

[1] Rapeer, "School Health Administration," chap. I.

have been completed in the elementary schools. For two reasons this is impossible: *first,* because habits wait upon instincts and capacities, and some instincts and capacities do not mature in the elementary school age; *second,* because the administration of health measures, even in the best elementary schools, is so far from perfect that a large part of the pupils still pass through without acquiring a full set of habits of right living. Not only is the health teaching very imperfect, but also the home environment is frequently not conducive to the formation of health habits. "More than 95 per cent of our public-school pupils come from homes where, for one reason or another, they fail to learn some things pertaining to their bodily welfare that every person ought to know."[1] It is not surprising, therefore, that a large per cent of high-school entrants are short on habits of right living. In the high school there is much to be done in the way of forming right habits. But beyond this is the necessity of vitalizing habit and prescription by an understanding of the laws and principles of hygiene.

Status of Health Teaching in the Elementary School.— The problem of health teaching in the elementary school is fully treated in the preceding chapter, but as the character of health teaching in the high school depends in a measure upon the character of the health teaching in the elementary school, a brief reference to that matter is necessary in this connection. In Massachusetts, for near a hundred years, the necessity of health teaching in the public schools was agitated intermittently. Results were meagre and unsatisfactory.[2] It was not until 1885, under the stimulus of the "scientific temperance" propaganda, that the teaching of health became compulsory by statutory enactment. With local variations of time and emphasis, the history of Massachusetts is the

[1] Moseley, "Some Ways of Teaching Practical Hygiene," *School Science and Mathematics*, January, 1912, p. 1 *f.*

[2] Towne, Lillian H., "Problems of Teaching Hygiene," U. S. Bureau of Education Bulletin No. 48, 1913, "School Hygiene," p. 74.

history of most of the other States. This propaganda aimed at "temperance," not at physiology. "In all grades below the high school this instruction should contain only physiology enough to make the hygiene of temperance and other laws of health intelligible. Temperance should be the chief and not the subordinate topic and should occupy at least one-fourth of the space in text-books for these grades." [1] Within fifteen years practically every State in the Union had enacted laws requiring the teaching of physiology and hygiene, "with especial reference to alcohol and narcotics," in all the elementary public schools.

The failure of the movement is generally conceded, and the reasons for failure have been abundantly set forth.[2] It aimed to prevent the use of alcohol and tobacco by teaching early the harmful physiological effects of these drugs. In its fervor for the cause it sadly mixed myth and science, sought to base concrete practise upon scientific understanding instead of the reverse, and preached the doctrine of fear and negation. The increased per-capita consumption of both alcohol and tobacco in the *generation* during which "scientific temperance instruction" has had place in the schools is sufficient proof of the failure of the specific aim of the movement.

The success of the movement, however, has not been generally recognized. This movement carried within itself two factors pregnant of results. *First*, it had the dynamic force of a moral idea. The moral earnestness of the "scientific temperance" propaganda that within half a generation wrote its laws upon the statute-books of practically every State in the nation, and then enforced obedience to those laws, is now coming to expend itself in the safeguarding of the health of school-children and in developing a kind of health instruction that shall build up habits of hygienic living and create a health conscience among the children.

[1] Billings, J. S., "Physiological Aspects of the Liquor Problem," 1903, vol. I, p. 23.

[2] Berry, Charles Scott, "High School Education," ed. by Charles Hughes Johnston, p. 347 *f.* (Scribners, 1912).

The second factor is found in the declaration of principles quoted above: "This instruction should contain only physiology enough to make the hygiene of temperance and *other laws of health intelligible.*" Here was a declaration of radical importance. "Naming the bones" has been the butt of many a jest on the part of the critics of the old text-book physiology; but up to the time of the "scientific temperance" movement no better doctrine had been formulated either by pedagogists or scientists. The principle was not observed in the "scientific temperance" text-books. For the most part, "temperance physiology" was merely grafted upon the old books and old methods. But the germinal idea had been found and it was the "scientific temperance" zealots that "fished the murex up," not their critics. The substantial principle of health instruction in the grades is *increase of health.* The methodological principle is subordination of anatomical and physiological fact to the laws of health. In only a few of the best schools does the teaching of health conform to these principles, but almost universal lip-service shows the direction of the wind. Text-books are appearing that embody these principles.[1] With the ideal well recognized and with adequate teaching material available there is no excuse for the persistence of outworn matter and methods. In writing of health teaching in the high school one may assume that the elementary school in the next few years will fulfil reasonable requirements.[2]

[1] It may not be invidious to mention the series by Gulick (Ginn & Co.), Woods Hutchinson (Houghton Mifflin Co.), Coleman (The Macmillan Co.), Bibb and Hartmann (The World Book Co.). In these books the laws and practises of hygiene are made intelligible; there is abundance of illustrative data; in some there is a good deal of simple experimental material; community hygiene is recognized and emphasized; anatomy and physiology are subordinated to hygiene.

[2] In this discussion the orthodox-organization eight-year grade and four-year high school is assumed. The next ten years will see a rapid modification of this scheme. (See "Economy of Time in Education," Bulletin No. 38, 1913, of the U. S. Bureau of Education.) The reorganization of the higher grades of the elementary school will make possible a much more effective teaching of all subjects than is possible under the present organization.

The High School and Community Leadership.—The American high school is our most interesting educational institution not only because of its essential character, "more democratic than the college and more selective than the elementary school," wherein "manhood and womanhood are visibly budding," but also because of its unprecedented growth and expansion during the past two decades. In 1891–2 there were in the United States 4,158 schools of secondary rank, 16,329 teachers, and 297,894 pupils.[1] In 1911–12 the numbers were, respectively, 13,268 schools, 64,236 teachers, 1,246,827 pupils.[2] This is an increase of more than 300 per cent in the number of pupils. The average annual increment is nearly 50,000. Even more striking is the acceleration of increase in the last four years of the series: 72,000 in 1909, and 131,501 in 1912. The increase in 1912 is 50 per cent greater than the average of the three years next preceding, and more than three times as great as the average of the preceding twenty years. The proportion of high-school pupils to the total school population has increased threefold in that time. About 23 per cent of the children of the present generation receive some high-school education. There is also a slow but steady increase in the number of pupils who persist through the four years of high school. In 1906–7 there were 89,882 pupils, or 12¼ per cent, in the fourth year; in 1911–12 there were 166,266 pupils, or 13½ per cent. In 1890 the high-school students were slightly less than one-half of one per cent of the total population of the country; in 1912 a little more than 1.3 per cent.[3]

The significance of these figures lies not in the facts of increase but in the potential community leadership of this rapidly increasing part of the body politic that receives the

[1] "High School Education," ed. by Charles Hughes Johnston, Introd. (Scribners).

[2] Rep. United States Com. Ed., 1912, vol. 2, chap. 8.

[3] Assuming that the annual increment in population in 1911 and 1912 is about the same as for the two decades preceding.

impetus of high-school education. The impact upon society of this stream of high-school-trained citizens becomes inevitably more massive. Whether it shall be effective in proportion to its mass depends upon the character of the high-school training. Whether it shall raise the health standards of the community in proportion to its possibilities for such service depends upon the emphasis that is placed in the high school itself upon the practise and the study of health. It is possible for the high school to ignore both the practise and the teaching of hygiene; it is possible for bad practise to nullify good instruction; it is also possible for practise and instruction to co-operate in safeguarding and promoting the vitality of pupils, and in enlightening their understanding with respect to the significance of public and personal hygiene. Not the least of the problems of the "new" high school is this of building up a public-health conscience.

The Physical Conscience.—It has been pointed out many times that the worship of Hygeia, so characteristic of the Greek civilization, and so repugnant to the early Christian culture, has revived within the last half-century. The modern attitude toward health is something more than admiration for physical strength, grace, and beauty. It involves also the idea of duty, the duty of realizing in oneself the physical virtues of strength, efficiency, and endurance. These are essential to the achievement of the "æsthetic, intellectual, and spiritual development to which our own age aspires."[1] It is the idea of duty in this conception that justifies us in speaking of "the physical conscience." It is the development of the physical conscience that is the special task of health instruction in the high school. Obviously the physical conscience cannot be a resultant of the study of quadratic equations, Latin declensions, and Burke's orations; it must be the resultant of hygienic environment, habituation to the practises of hygienic living, and an understanding of the principles of hygiene.

[1] *Ibid.*, p. 346.

The Physical Status of High-School Pupils.—How much the development of the physical conscience is needed is apparent when one investigates the physical status of high-school pupils; and even more, perhaps, when one examines their health ideas and ideals. The records of physical examination show a large amount of defect and ailment among high-school pupils; examination of their health ideas and ideals shows an appalling amount of ignorance of both personal and public hygiene and an equally appalling amount of complacency with respect to ill health. Many exhibit an almost fatalistic acceptance of physical inferiority. They recognize neither the disgrace of being weak nor the duty of being strong.

Casual observation of high-school pupils shows a surprisingly large amount of physical imperfection. Careful physical examination fully confirms casual observation. Recent records of physical examinations in Newark, N. J.,[1] and Washington, D. C.,[2] are probably typical.

In Newark during the years of 1911–12 and 1912–13 practically all of the high-school pupils of both sexes were given systematic and thorough physical examination. The Washington record is of 284 girls in the Eastern High School of that city. In Newark the physical examination showed the following results for the two years:

Average number of pupils examined	2,186
Average number of pupils normal	802
Average number of pupils with defects	1,384, or 63 per cent

The average total number of defects for the two years was 2,204, distributed as follows: adenoids, nasal obstructions,

[1] Rapeer, in "The Modern High School," ed. by Charles Hughes Johnston, chap. XXVII.

[2] Small, W. S., "Some Results of Systematic Physical Examination of High School Pupils." Proceedings Fourth International Congress on School Hygiene, 1913. (Reprinted in *The School Journal*, January, 1914.)

etc., 101; defective hearing, 103; dental defects, 740; enlarged tonsils, 298; visual defects, 555; enlarged glands, 17; heart defects, 102; weak lungs (not tuberculous), 22; malnutrition and debility, 78; mentally defective, 1; nervous affections, 5; defective palate, 8; orthopedic, skeleton, chest, 42; spinal defects, 19; speech defects, 5; all skin ailments, 110.

According to these figures two-thirds of the high-school pupils in Newark are physically defective. This does not take account of about thirty classes of ailments not reported in the returns. This is a larger percentage of defect than is found among elementary-school pupils, according to Doctor Rapeer.[1] It is probable that there is exaggeration in the Newark figures of the number of cases of defective hearing, defective vision, enlarged tonsils, heart defects, and orthopedic defects. The ratio of these per 1,000 pupils is so much greater for these high-school pupils than for elementary-school pupils, as estimated by Doctor Rapeer, upon the basis of extensive and carefully analyzed data, that the presumption is against the accuracy of the figures.

In the case of vision the exaggeration is obvious, as the "standard for defective vision is fixed at 20/30 instead of 20/40, which permits the recording of many minor cases of defective vision that are not referred for glasses." It is likely that the same is true also of the other types of defect. On the other hand, it is not improbable that the examination of these high-school pupils is more thorough than that ordinarily given to elementary-school pupils.

The physical-examination record of 284 girls in the Eastern High School of Washington in 1912–13 shows general correspondence with the Newark record. These students had been in school from one to four years. The numbers are much smaller than the Newark numbers; only girls are concerned; and the examination was a physical rather than a medical examination. On the other hand, the examinations were semiannually repeated. The girls were continuously under

[1] *Ibid.*, p. 686.

observation, and medical examinations were made in doubtful cases. The examination records were supplemented by notes of observations. They are a fuller chart of the health of the individuals concerned than are the Newark records.

Of the 284 girls, 168 girls, or 59 per cent, had defects of some kind—59 per cent as compared with 63 per cent in Newark. These 168 girls had a total of 378 defects, an average of more than two each. The recorded defects were distributed as follows: eyes, 93; ears, 24; spine, 30; heart, 29; lungs, 2; nose and throat, 19; enlarged glands, 26; developmental, 48; carriage, 71; ankles, 36.

These two sets of figures show a large amount of defect and ailment among high-school pupils. The type and frequency of ailment found in the high school and the elementary school are similar, and point to an urgent need of enlightenment of high-school pupils with respect to health.

The significance, however, of figures in regard to the defects of high-school pupils lies not chiefly in the prevalence and distribution of defects; it lies rather in improvement and improvability. The correction of defects and the improvement of health during the high-school course are evidence at once of effective health teaching and of the development of the physical conscience. The persistence of remediable defects may be no reflection upon the teaching, but it is infallible evidence that the physical conscience has not been aroused.

The Newark records show nothing in this connection. In the Washington school the record of corrections is as follows: Of the 378 defects recorded for 168 girls cited above, 116 defects, or 30 per cent, had been corrected at the end of 1913; and of the 168 girls with defects, 88, or 52 per cent, had had some defects corrected. *One-half* of the defects of the fourth-year class had been corrected; *one-eighth* of those of the first year. Thirty-five girls who had been continuously in the school for four years show the following record of correction of defects:

Year	Number of girls with defects	Total Number of defects	Number of defects corrected
I.....	35	72	13
II.....	32	61	7
III.....	29	56	11
IV.....	28	45	8
Total.....	35	79*	39
Number at end of fourth year.....	25	40	39

* Seven new defects were discovered after the first year.

The progressive correction of defects is noticeable. In this fourth-year group, 50 per cent of the defects were corrected and 30 per cent of the defectives were improved.

On the other hand, the number of remediable defects not remedied is eloquent testimony to failure. In case of the 35 girls above mentioned, there were 40 uncorrected defects; only 6, or 15 per cent, were irremediable. In all other cases, the pupils didn't care enough about health to pursue faithfully the regimen that would have corrected the defect. Occasionally the mental, mind-stuff theory of disease stands in the way. In some cases, it is the vulgar fatalism that accepts defect as a matter of course. More frequently, it is mere thoughtless indifference—don't want to take the trouble. In still other cases, vanity rebels against the necessary prescriptions as to clothes, shoes, glasses, etc. Unhygienic habits of life in some instances are so deeply rooted that a complete revolution in respect to diet, dress, sleep, exercise, and work would be required. There is no physical conscience, no appreciation of either the beauty or duty of health.

Status of Health Teaching in the High School.—Both in character and extent the present status of health teaching in the high school is unsatisfactory. In 1910 Doctor Gulick[1] reported that of 2,392 representative high schools throughout the

[1] Gulick, L. H., "Report on Status of Physical Education in Normal Schools and High Schools," Proceedings Fourth Congress American School Hygiene Association, 1910, p. 174.

country, only 16 per cent gave regular instruction in hygiene and only 6 per cent had physical examination of pupils. In 11 per cent, instruction in hygiene was compulsory. Studies by Crosby[1] and Hunter[2] show that physiology and hygiene in many schools are taught only in the first year of the course, prior to the study of any basic science. The method and matter are merely a rehash of elementary-school instruction. In general, the subject does not command either the interest or respect of the pupils. The case with physical training is no better. Doctor Gulick's report shows that only 8 per cent of the high schools gave regular instruction in gymnastics. In most cases the instruction is formal and involves little collateral teaching of hygiene.

There are, however, encouraging signs. In a few States health instruction is compulsory in high schools as well as in elementary schools, and the number is increasing. The rapid growth of medical inspection of schools and the development of medical inspection into health supervision, with a complete programme of health promotion and control in all the public schools, is giving a new impetus to health teaching in the high schools. The organization of health instruction in high schools is making progress. There is still need for propaganda, but the important problem is the content and method of health instruction.

Lack of College Credit.—It is alleged that failure of colleges to give entrance credit for physiology and hygiene is one reason for the neglect and inefficiency of the teaching in the high schools. This is probably true, as the high school has been and still is strongly influenced by college-entrance requirements. In general, subjects have been legitimized in the high-school course by college favor. Other subjects have come in as poor relations and have been nurtured accordingly.

[1] Crosby, Clifford, "Physiology, How and How Much?" *School Science and Mathematics*, vol. 7, 1907, p. 738.

[2] Hunter, G. W., "Biological Science in Secondary Schools," *School Science and Mathematics*, vol. 5, 1910, p. 3.

Three factors, however, are likely to effect a change with respect to hygiene. The first of these is the essential importance of the subject itself. From the practical standpoint its importance is recognized by those colleges which now demand a physical examination as one of the evidences of fitness for college entrance. As soon as it is recognized that systematic instruction in physiology and hygiene has practical relations with health habits and ideals, there will be a more hospitable attitude on the part of the colleges. The second factor is germane to the first—the colleges are rapidly coming to recognize the necessity and the potency of health instruction in college. The necessity is frequently attributed to the failure of the lower schools to provide such instruction, which is, of course, a confession that the high school ought to provide it. "In 1884 hygiene was taught in 61 per cent of the 46 leading colleges. In 1909 it was taught in 84 per cent of the 116 leading colleges." At the present time "80 per cent of the colleges offering regular courses in hygiene give positive credit for these courses toward the bachelor's degree." The tendency is for all college subjects, that are within the capacity of the early adolescent mind, to gravitate, sooner or later, into the secondary school. Obviously hygiene is of this class. The third factor is the growing tendency of colleges to accept for entrance credit any high-school subject that is valuable and well taught. Successful teaching of hygiene in strong high schools will be cogent argument for college-entrance recognition. On the other hand, recognition by the colleges would be a powerful stimulus to sound teaching of hygiene in the weaker and more timorous high schools. For the sake not only of the high school but also of its own higher efficiency, the college should encourage this teaching by granting entrance credit.

The Locus of Health Teaching in the High-School Course.—The aim of health teaching in the high school as stated by Doctor Berry is "to give the pupil a scientific knowledge, as far as possible, of the principles of physiology, hygiene, san-

itation, and physical education, with a view to their practical application. But if this aim is to be realized the pupil must have acquired some knowledge of biology, and should also have studied chemistry and physics before beginning the proposed course in physiology and hygiene."[1] This means, of course, that this subject must be placed as late as the third year of the course; and, as most high-school courses are organized, it must be placed in the fourth year.

This is partly right and partly wrong. That the knowledge acquired by pupils in such a course should be "scientific as far as possible," is self-evident. That instruction in hygiene and physiology must be delayed until late in the course on the ground that the study of biology, chemistry, and physics is a prerequisite, is probably both impractical and unnecessary.

The plan presupposes that these three sciences are prescribed for all pupils. This may be desirable, but there is slight probability of the general adoption of such a prescription. Even were it adopted, there would still be the objection that only a minority of high-school pupils would be reached. In 1906–7 the distribution of high-school pupils for the nation was as follows: fourth year, 12.25 per cent; third year, 18.17 per cent; second year, 27.23 per cent; first year, 42.35 per cent. There is a constantly increasing persistence of high-school pupils, as is shown by the corresponding figures for the year 1913–14: fourth year, 14.27; third year, 18.84; second year, 26.75; first year, 40.14.[2] Allowing for factors other than mortality, it is certain that even now less than one-half the pupils who enter high school ever reach the fourth year. If instruction in physiology and hygiene is as important as we have contended, then it is imperative that all high-school pupils should have the benefits of such instruction. This is recognized by those States which require this teaching in the first high-school year. There must be health instruction in the first year, but this does not exclude further instruction

[1] *Ibid.*, p. 357.

[2] U. S. Bureau of Education, Statistics of Public and Private High Schools.

in subsequent years. There should be continuous teaching of health, collaterally and incidentally, in all the years of the course; and there should be in the last year a systematic course in physiology, anatomy, and hygiene utilizing the knowledge of the basic sciences that may have been acquired by the pupils, the experience of the students in matters of public and personal hygiene, the data of physical training, the other health agencies and instrumentalities of the school, and the public-health agencies, both governmental and voluntary.

There is a great deal of health instruction that is collateral to other subjects and incidental to school life. Wherever facts and principles of hygiene are germane, they should be taught. There need be no fear of wasteful repetition. Repetition under varying conditions and with varying associations means organized, vital knowledge. The relation of air and health will serve as an illustration of direct and collateral teaching. This topic may be taught in the first-year course in hygiene, in chemistry, in biology, in physics, in civics, and in the fourth-year course in hygiene. There need be no repetition that will cause students to "go stale" on the subject. In the first-year hygiene, emphasis will be placed upon the general physiological facts in regard to air and health. This can be scientific without laboratory or apparatus. It is only necessary that cause and effect be emphasized constantly. For example, give as a problem for analysis the results in health and mental improvement of the open-air school. The report of the results of a year's work in any carefully conducted open-air school will provide the data. Then let the students analyze the conditions and state the factors contributing to results. The work will thus be rescued from the doldrums of grade-school repetition and given interest and vitality. It will be scientific but will not involve technical knowledge of biology, chemistry, or physics. When the student comes to the study of chemistry, he will learn the chemical composition of the air and will have experiments in air-testing. In physics he will learn the significance of air currents, of temperature, humid-

ity, and perhaps the mechanism of artificial ventilation. In biology there should be study of the relation of air to the cells of the body and study of the bacteria of the air. In civics the relation of pure air to industrial efficiency, and laws and ordinances relating to ventilation of schools, factories, etc., should be considered. In the systematic work of the fourth year there should be co-ordination and integration of the knowledge of all the pupils. In few, if any, high schools would all the fourth-year pupils have studied all the subjects specified above. This would not be entirely a disadvantage, as it would give opportunity for co-operative work by members of the class. For example, those who had studied chemistry might demonstrate the chemical tests of air. The result would be mutual contribution and fuller and more vital knowledge.[1]

Such a plan of procedure would integrate health teaching. The direct and collateral teaching would not be unrelated and unsystematic, but rather would be co-operative factors in producing the desired result—knowledge that is at once scientific and practical.

Content of Instruction.—Assuming that formal health instruction is to have place in both the first and the fourth years, what should be the content of the courses?[2] Berry suggests as the essentials "physiology, bacteriology (which is essential to the understanding of the nature of infectious disease), personal and social hygiene, sanitation, and physical education. . . . Now is the time to emphasize social hygiene and sanitation. Let the youth realize that in living hygienically he is doing but half his duty; the other half is to co-operate with others in the struggle to transform an en-

[1] Davis recommends that hygiene be taught in the first year as a phase of general science. (Report of the N. Y. School Inquiry, Vol. II.)

[2] If limited to one year, the content need not on that account differ materially from that suggested *infra*. If given in the first year, there would be no difference, though in schools where biology is prescribed in the first year the hygiene might be included in the biology. If given in the fourth year, the difference would be in extent rather than in kind.

vironment unfavorable to the health of the community. . . . There are few pages in modern history more fascinating, and few illustrate more strikingly the power of knowledge, than those which tell of man's desperate struggle with disease."[1]

Moseley would prescribe a course for all students in anatomy, physiology, and hygiene. The character of the course given in the first semester in the Sandusky High School is sketched as follows: "The mere learning and reciting of lessons from a book may not be useless, but it should be supplemented by experiments, some of which the pupils can do at home and report on at school. A fresh heart and lungs should be obtained from a butcher and the lungs inflated. Each pupil should see the circulation in the web of a frog's foot or some other animal membrane. Models of the eye and several other organs should be examined. The application of the lessons to actual living should be discussed freely and the difficulties of properly applying the knowledge acquired should be overcome if possible. The pupil while in the secondary school will not become much of an anatomist or physiologist, but should acquire sufficient knowledge of these subjects to help materially in understanding hygiene."[2]

He also emphasizes the conquest of disease. "In a town in Africa I interviewed schoolboys, apparently about twelve years old, who could tell me about Louis Pasteur. In this country are we to turn out high-school graduates who can name the wives of Henry VIII but who have never heard of Pasteur, or Koch, or Chittenden? Are the adventures of Æneas at the court of Dido more important or more interesting than the discoveries of Reed, Carroll, or Lazear?" Another urges that the high-school course in hygiene be "differentiated to meet the needs of pupils entering specific types of vocations."[3]

[1] *Ibid.*, p. 358.

[2] Moseley, "Some Ways of Teaching Practical Hygiene," *School Science and Mathematics*, vol. 12, no. 1, January, 1912.

[3] Towne, Lillian H., *ibid.*, p. 75.

These citations illustrate the tendency to emphasize social and community hygiene in the high-school course. If the pupils entering the high school have been taught the elements of personal hygiene in the elementary schools, then the first-year course in the high school should emphasize the social and community phases of the subject.[1] The following topics certainly should be included: air and health, including a study of the ventilation of the school; the public water supply, its reason for being and its condition; milk-supply; insect carriers of disease; prevention and control of infectious diseases, including immunity; vital statistics;[2] food, cooking, and pure-food laws; industrial hygiene; the work of the health departments, State and national as well as local; and a review of personal hygiene with special reference to matters of immediate significance, such as exercise, military drill,[3] recreation, sleep, vision, elements of mental hygiene, stimulants and drugs, and clothing. Such a content could be given satisfactorily in a half-year course of five periods a week; it could be given better if integrated with the physical-education work, as suggested in the following section, and carried through the first year.

The Drama of Preventive Medicine.—Two of the writers quoted above, Berry and Moseley, emphasize what might be called the drama of preventive medicine. This is well. Here is opportunity to appeal to the ancient fighting instinct and turn it to account in the conservation, rather than the destruction, of human life. There is the patient heroism of research students like Pasteur, Koch, and Chittenden, comparable to the labors of military strategists; there is the martyrdom of those like Carroll, Lazear, and Ricketts who have

[1] If the work in the grades has been perfunctory, superficial, or desultory, then the upper-grade book of any of the series mentioned above would serve admirably as the basis of the first-year high-school course. Another useful first-year book is Tolman and Guthrie's "Hygiene for the Worker."

[2] Bibb-Hartmann's "The Human Body and Its Enemies" has an admirable chapter on this subject, entitled, "Keeping Account of Our Treasure."

[3] In schools that have military drill,

sacrificed life on the firing-line of health science, corresponding to the martial heroes who have held life cheap on many a bloody field; and there are the knights errant of medical science like Goodhue of Molokai, who serve the outcasts of the earth and at the same time add to the knowledge which conquers disease.[1]

A large part of the instruction in social and community hygiene might radiate from this centre. The teaching easily becomes vital, scientific, and dramatic. Let the starting-point be biography; let the heroism of the sacrifices and the nobility of the martyrs shine forth; but let the scientific achievement in each case be clearly revealed. Concretely, suppose a class of thirty pupils. Let the teacher select for study five or six of these heroic figures, each representing an important scientific achievement. Assign each to a group of five or six students, give references, and have reports covering in each case: (1) a brief biography, (2) the special episode, (3) the scientific achievement. The class exercise will consist of presentation and discussion of reports, the teacher correcting, clarifying, and vitalizing the process. Science will acquire for these students a new dignity, and life a new sanctity.

Systematic Work in Final Year.—As suggested above, the systematic course in the fourth year should unify and deepen the knowledge of health matters that may have been acquired by the students both in their school studies and in their personal experience. This should occupy one semester. Two plans are feasible: a rather narrowly defined course in physiology based upon laboratory experiment; or a topical

[1] The drama includes privates who are rarely heard of, as well as the laurel-crowned leaders. After the death of Doctor Lazear in Cuba two private soldiers, John R. Kissinger and John J. Moran, volunteered as subjects of experiment. Major Reed explained to them the danger of the experiment, the inevitable suffering and possible death resulting from the bite of the infected mosquitoes; but as they remained firm he then offered them money compensation. Both declined, saying that they volunteered "in the interest of humanity and the cause of science." "In my opinion," wrote Major Reed afterward, "this exhibition of courage has never been surpassed in the army of the United States." (Coleman, "The People's Health," p. 144.)

course, synthetic in character, utilizing the pupils' knowledge of the basic sciences, personal experiences, data of physical training, and the various health agencies. If the former method is followed, a well-equipped laboratory is necessary. An adequate text-book and laboratory manual are almost equally necessary.[1] If the second method is followed, the plan in use in the Sandusky High School is a suggestive model.[2] The study of hygiene is carried on in connection with rhetoricals. "In the first half of the senior year the essays all pertain to matters of health and are followed by comments by the teacher and sometimes discussion by the pupils." Subjects: "Various diseases, their effects, their causes, and how they may be avoided; the pupil choosing a subject, if possible, which he knows about from experience." Other subjects are: "The most important factors in the maintenance of health, the most neglected factors in the maintenance of health, erroneous notions about health and disease, length of human life, occupation, exercise, gymnastics, rest, sleep, worry, overwork, clothing, bathing, care of the eyes, care of the teeth, medical education, a doctor's experiences, trained nurses, medical frauds, patent medicines, what a city should do for the public health, and quite a list of subjects pertaining to food and drink."

The Teacher.—It is essential that the health teaching should be "conducted by a teacher who is interested in it and will endeavor to make it of practical value."[3] This is logically the teacher of physical education. The cultivation of health habits and ideals is the chief function of the physical trainer. Drills, setting-up exercises, apparatus work, dancing, games, athletics, are all worth while but only as they are instrumental in building up positive health in the pupils and quickening in them a sense of the dignity and the worth of physical fitness.

[1] Such as Eddy's "Text-book in General Anatomy and Physiology and Experimental Physiology and Anatomy" (American Book Co.) and Hough and Sedgwick's "The Human Mechanism" (Ginn & Co.).

[2] Moseley, *ibid.*, p. 3.

[3] Moseley, *ibid.*, p. 2.

The gymnasium and the playground are laboratories for the study and the application of the principles of hygiene. "The teacher of physical training and gymnastics is the most effective because the most intimate teacher of personal hygiene. The physical examination and the conduct of physical exercises give occasion and opportunity for instruction in every important aspect of hygiene both personal and general. The harvest from this field is rich for the high-minded and adequately prepared teacher."[1] After all, effective teaching is not that which develops a subject but that which touches the individual. Adequate physical examination, without which physical training is shooting at random, brings the teacher into the closest and most confidential relations with pupils. It enables the teacher not only to prescribe regimen for the individual but also to generalize the physical conditions and needs of the mass of pupils. It opens the way for effective co-operation with parents, without which instruction is largely void of practical results. It is rational and economical, therefore, to concentrate in the hands of the physical-training teacher both the practical training in physical morals and the scientific and formal teaching of physiology and hygiene.

This is in line with the tendency, in the general supervision of health in school systems, to concentrate all health activities in one department. The Boston Department of School Hygiene, which is the prototype of many others, has general control of all matters affecting the physical welfare of pupils and teachers, except inspection for contagious disease, which is under the Board of Health. The director has charge of physical examinations, nurses, instruction in physiology and hygiene, gymnastics, athletics, and playground instruction. Newmayer[2] gives as the functions of "medical

[1] Small, W. S., "Biologic Science and Health," Proceedings First Congress of the American Association for the Study and Prevention of Infant Mortality, p. 34.

[2] "Medical and Sanitary Inspection of Schools, Philadelphia," Lea & Febiger, 1913. See also Rapeer, "School Health Administration," Teachers' College Press, 1913.

inspection": detection of contagious diseases, detection of physical defects, finding capacity of individual pupil, insuring hygienic surroundings, and teaching hygiene and healthful living. The movement toward the centralization and co-ordination of all the health factors in the educational practise and environment is very marked.

The concentration of all the physical-welfare interests of college students in the department of physical education is already an accomplished fact in most colleges. The activities usually so grouped "include the teaching of hygiene, gymnastics, and athletics, care of students' health, and, in some cases, the supervision of the sanitary conditions of school-buildings, dormitories, kitchens, water-supply, and grounds. The further development of this growing tendency is limited only by the supply of competent men."[1] In the College of the City of New York such co-ordination has been very completely worked out under the direction of the professor of hygiene and physical education.[2]

It might seem that this plan would emphasize personal hygiene at the expense of social hygiene, but that is far from necessary. Wherever students have community interests and practises there will arise problems of community hygiene. "The sanitation of the exercising hall, the locker-room, and the swimming-pool are emphasized as matters of community importance and each student is taught the obligation to himself and to the community in which he lives in his relation to his fellow students. In this connection it may be noted that the swimming-pool serves as a sort of index to the standard of hygiene maintained by the student community using the pool. If the bacteriological analysis shows evidences of human contamination, the fact is brought to the attention of the

[1] Meylan, "Report of the Committee on Status of Instruction in Hygiene in American Educational Institutions," Proceedings Fourth Congress of American School Hygiene Association, 1910, p. 173.

[2] Storey, "Protection of Student Health in the College of the City of New York," Bulletin No. 46, U. S. Bureau of Education, 1913, "School Hygiene," p. 75.

classes using the pool and responsibility is placed upon them."[1]

At present the swimming-pool is exceptional in the high-school equipment. Within the next decade it will be common in large new high schools. Where it exists, no better means of community hygiene instruction could be desired. The co-operation of the biological department is required for bacteriological analysis. Where there are shower-baths, students are frequently careless about the use of dressing-booths and towels. A scarcely less impressive lesson might be based upon bacteriological analysis of towels. The active co-operation of the student body in promoting cleanliness and general community hygiene may be organized. This, indeed, may be done independent of any formal teaching of hygiene by physical trainer or any other teacher,[2] but would be a natural development of organized hygiene work in the physical-training department.

Physical training should be compulsory through all four years. The logical plan would be to have the teachers of physical training give the first-year course in physiology and hygiene, as specified above, carefully co-ordinated with the practical work in physical education. The most vital problems of personal and community hygiene should be selected for treatment. Time should be allowed for incidental instruction in hygiene throughout the course. To insure realization in conduct of knowledge acquired in the first year, there must be the constant reinforcement of repetition. Application and implication must be renewed, emphasized, amplified. It would not be necessary or even desirable to have a fixed time for such instruction, but the teacher should be alert for *occasions* for such instruction. Violations of hygienic rectitude by members of the class, illness or quarantine of a mem-

[1] Storey, *ibid.*, p. 76.

[2] Hunter, U. S. Bureau of Education, Bulletin No. 48, 1913, "School Hygiene," p. 48. An account of an interesting and successful movement of this nature in the DeWitt Clinton High School.

ber, revelations of "unfitness" in athletic meets, results of physical examinations, improvements made in sanitary conditions of the school, lunch habits of students, care of lockers, ventilation of classrooms—these are illustrations of occasions for halting physical exercises and having a heart-to-heart talk with (*with*, not merely *to*) a class group. Further, there should be the means in the gymnasium for demonstrating physiological and anatomical facts as occasion may arise. A manikin, models of important organs, charts, and lantern slides should be essential parts of the equipment of the physical-training room. References should be easily available so that important topics may be studied further and reported upon.

Conclusion.—Two objections may be made to this plan of procedure—one, that as yet comparatively few high schools have a teacher of physical training; the other, that comparatively few teachers of physical training possess the scientific training in biology, physiology, and hygiene requisite for the successful conduct of the health teaching as outlined. These objections lie not against the plan itself but only against its present feasibility. It is true that few schools have a teacher of physical training—8 per cent according to Gulick's investigation, cited above—but it is equally true that few schools include health teaching in their courses of study. Recognition of the unitary character of these two factors in health education will give both impetus and direction to the movement for definite and systematic teaching of the subject. The other objection is no more substantial. It is probably true that many, if not a majority, of the present high-school teachers of physical training are disciples of some "school" of gymnastics. Comparatively few have been broadly trained in the sciences that are fundamental to the understanding of hygiene. They are teachers of gymnastics, not of hygiene. This condition, however, is improving. Universities, colleges, normal schools, and the special schools of physical training are gradually establishing physical education on the right basis. An insistent demand for teachers

of physical education, adequately trained according to the standards indicated in this chapter, will tend to hasten the supply. In the meantime, the instant need must be met in the practical way suggested at the beginning of this section, by placing the health instruction in the hands of a teacher, regardless of his major subject, who is interested in the matter and will grow up with the work.

CHAPTER XXII

INDUSTRIAL HYGIENE AND VOCATIONAL EDUCATION

The Anomaly.—To those who have studied the pressing problems of working people, a serious anomaly appears in American industrial education. The movement for industrial education has been a most desirable effort to help the great masses of our people solve successfully through public education one of the most serious problems of life—that of making a living. A rough analysis of this problem has associated vocational preparation with forges and lathes, special schools, and costly apparatus. Educators have clamored long and loudly for appropriations with which to begin this work. They have said: We can do nothing until we get the money with which to purchase this equipment. And they have done nothing without it.

Now a more thorough survey of the prime needs of the world's workers will reveal two very essential and fundamental factors of vocational education which most industrial courses and schools very largely overlook, and which are moreover comparatively inexpensive. These are, first, the development of general industrial intelligence, including acquaintanceship with the complex industrial world of the present; and, secondly, thoroughgoing education in general, industrial, and occupational hygiene. While they are waiting for appropriations, school systems could be giving, without very great outlays of money, fundamental instruction with regard to our complex industrial life, and this invaluable health education largely by the use of the schoolmaster's favorite instrument—the book, a simple, inexpensive tool.

Health Education for Workers as Vocational Education.[1]—Let us glance at just one of these propositions—that in reference to health education for workers as primary vocational education. What is the health problem for our working people? From extensive studies of mortality statistics and the data of private and public insurance agencies here and abroad, as well as from many special studies, we learn with respect to the illness problem that there are in this country not less than 13,000,000 cases of sickness each year among those engaged in industrial pursuits. The effects of such illnesses are well known. Illness reduces bodily efficiency, causes losses of work and of wages, and frequently ends in death. Webb, Devine, and other social students and workers are agreed that to the sickness of workers is directly due over 25 per cent of all poverty and destitution.

Health Conditions of Workers.—Rubinow, in his "Social Insurance," reports that in Austria, where the government insures workers against illness and where accurate records are kept of the illness problem of workers, with nearly three million workers insured in 1907, there occurred 1,623,000 cases of sickness, causing a loss of 28,000,000 days. Fifty-three per cent of the entire working army suffered such loss, and the average time lost was 17 days each. How much of low vital working efficiency there resulted could not well be measured.

In Germany, with over 13,000,000 insured against sickness, there were (in 1908) 5,200,000 cases of illness, or 40 per hundred persons, and the number of days lost was 104,000,000, or 20 days for each case of sickness, and an average of eight days for each of the thirteen million insured. Of course, these are only partial costs, since the public taxation for public hospitals and other such health agencies is not here included, and still other costs are omitted.

Since we have as yet in this country no such systems of social insurance, we do not yet have accurate statistics of the health problem of our own workers. But these illness losses

[1] This chapter appeared in the *Educational Review* for December, 1914.

may from several sources be computed as an average of over two weeks of work and not far from 5 to 15 per cent of the workers' annual wages, including medical, burial, and other such expenses, both private and public. When we study the annual wages of our workers, a large proportion of them now being industrial wage-earners of the factory type, and find that the median annual wage is not far from $650 to $700, and that this sum is hardly up to, and certainly not above, the minimum amount necessary for a family with which to maintain a minimum standard of living—when we see our industrial population working so close to this minimum—then we realize what the direct and indirect loss of even one-twentieth of the annual wages for sickness really means, especially when we learn further that about 50 per cent of it is reasonably preventable. Our working people cannot afford it.

Yet such data scarcely show up the complete death and lowered vital efficiency problems of workers. Over one-fifth of the children brought into the world each year, at such cost, die in the first year; one-fourth are dead before the age of five; and half of all born into the homes of our workers die before the age of twenty-three. Over 1,600,000 of our total population die each year, 100,000 of them of school age. This is an annual loss of about 2 per cent of our total population, which, in an enlightened civilization, is about double what it should be.

We cannot avoid the conclusion that the most fundamental form of general and vocational training is that which would enable the working population to meet more effectively these death, illness, and lowered vital efficiency losses. Moreover, the young men and women, the boys and girls of our schools, very much need this type of vocational education because they themselves are seriously defective and ailing. Doctor Chisholm's studies of the girls preparing for work in Manchester, England, the great amount of data collected in our medical supervision of schools, and the statistics of ex-

aminations for army recruits and for those entering industry abroad, all show the extreme importance of complete and thoroughgoing systems of educational hygiene for our working people.

Health and the Working Girl.—Mrs. Woolman says of the girls entering the Manhattan Trade School for Girls: "The young wage-earner who goes into trade untrained at fourteen years of age is greatly handicapped by her physical condition. Either through ignorance or neglect, early symptoms of disease are disregarded, and it is not until she finds herself out of employment as a result of physical weakness that she realizes that good health is *the* capital of the working girl." And again: "The young wage-earner . . . is much handicapped by her physical condition; heredity, poor habits of life, and insanitary homes show their effects on her. The girls, however, are young enough to remedy many of their defects. In a few months they will be in positions demanding eight or more hours a day in which they must strain every nerve and bend all their energies to meet the standard brought about by trade competition."

We do not need to demonstrate by the statistical studies that have been made that the general, the industrial, and the occupational hygiene phases of vocational education for health efficiency are wofully neglected in the schools of this country. Our teachers do not know the elements of general, personal, and public hygiene, not to mention industrial and occupational hygiene. We have few good text-books in hygiene in use, and little or no time is given to the subject as a school study. An extensive study of actual courses in vocational education shows that, with but practically one exception, the only progressive work of this type is being done abroad. Our vocational courses, like our general elementary and high-school courses, almost entirely overlook this form of vocational preparation.

The anomaly, then, in summary, is about as follows: hygienic education an indispensable phase of vocational

education; and yet an almost total lack or great inefficiency of health education, both general and vocational; millions of workers suffering high illness, death, and lowered vitality losses; and yet the spectacle of educators clamoring for the costly tools for a narrow type of vocational training while at the same time neglecting the preparation so near, so fundamental, and so comparatively inexpensive.

What is Being Done.—The best evidences I have been able to find of adequate attention to this important matter have been in Munich, Germany, some schools of England, the schools of Sweden, and the Manhattan Trade School for Girls (not true for the one for boys as yet) in New York City. Doctor Kerchensteiner in Munich has not only medical examinations and follow-up work and attention to sanitation and physical education, but he has a regular course intended to give intelligence with respect to the complex industrial and civic world of to-day and the elements of general, industrial, and occupational hygiene. His course is called Civics and Hygiene.

Sweden has all these features but adds to them a most progressive feature in the form of health vocational guidance and follow-up work, including annual medical examinations by government medical examiners until the youth reaches the age of eighteen. A young man may be changed from occupation to occupation; he may be given shorter hours and guidance as to his health regimen; and may even be kept out of work altogether until he is physically fit. In England, medical supervision and follow-up work with some health vocational guidance is rapidly making its way. In these countries the insurance of workers against sickness by the state makes the problem of health preparation perhaps not such an acute one as here, yet these countries are leading the way in school-health work.

An American Example.—The Manhattan Trade School for Girls gives each girl careful physical examinations, annually or more often, and supplements this with thorough

follow-up work; the home and school environments are made as sanitary as possible; medical, corrective, and recreational gymnastics, including plays and games, are much used, meeting individual and class needs; there is a great deal of practical teaching of general personal and public hygiene, and of the most usable phases of industrial hygiene, developing later into specific occupational hygiene for those going into definite trades. Last, but quite important, is careful guidance and follow-up work along sanitary and personal-health lines after the girls have gone into industry. Further than these few examples, we can point to little that is worth while.

Employers Awakening to Health as Capital.—The recent success of the Life Extension Institute in getting employers of hundreds and thousands of working people to furnish each one free of charge with an annual, very thoroughgoing medical examination, and the remarkable revelations of the low health status of most of these industrial workers, show what the world of industry is beginning to think of thorough health education from the earliest years on. It moreover indicates that we are here on the right track.

What Must be Done.—Now we have seen the anomaly and what is being done in a few places here and abroad to eliminate it. Let us next see what in this country must be done along this line. Briefly we must have:

(1) Thoroughgoing medical supervision of all school-children, and those before and after the school years so far as possible, especially annual or more frequent examinations and follow-up work of a corrective and preventive character.

(2) An improved sanitary environment at home, in school, and at work.

(3) Adequate individual and collective physical education, including medical and corrective gymnastics, plays, games, recreation, etc.

(4) Improved teaching of hygiene, general personal and public, general industrial, and occupational hygiene, each person getting as much of each as is reasonably possible.

(5) Careful health vocational guidance up to the age of eighteen or twenty if possible.

School-Health Work.—Elementary and high schools must pay more attention to these phases of health education, using teachers who have improved health training, and text-books superior to those in vogue, along the lines perhaps of the Gulick, the O'Shea, and the Ritchie series. In the year or so before pupils go out into industry, they must have added to their instruction some general industrial hygiene such as is desirable for all workers of their kind. And, third, if possible, they must have some knowledge of the special hygienic precautions necessary in the special occupation the pupils are sure to take up, occupational hygiene. Those going into teaching, for example, must, in their professional training, know the hygiene of their occupation, namely, teaching; those going into the lead industries must know how to meet the lead-poisoning problem; and so on.

Hygiene Texts for Vocational and Social Preparation.—Fortunately, some good texts are being published which will aid in the teaching side of the problem, including general personal and public hygiene, and general industrial hygiene. I take time to mention one entitled "Hygiene for the Worker," by Tolman, a text-book on personal, public, and industrial hygiene which hooks on to the keen interest of children to go out into industry, and which sets them at work in direct industrial preparation in the ways of health knowledge, health ideals, and health habits of value to them as workers. The chapter headings of this volume may indicate the wealth of modern hygienic knowledge recently developed which can now be put at the disposal of those who wish to help our working people to get fundamental preparation for their work.

These chapter headings are as follows: "Applying for the Position," "Preparing for the Day's Work," "Good Habits for the Worker," "Suitable Clothing, Food, and Drink," "Alcohol and Tobacco," "The Noon Hour," "Hygiene of the

Workroom," "Fatigue," "After Hours," "Holidays and Outings," "Choice of an Occupation," "Occupational Dangers," "Accidents," "Poisons and Fumes," "Fire," "First Aid to the Injured," "What the Worker Has a Right to Expect," "Seasonal Hygiene and Tuberculosis." This is the best attempt made so far to meet the need of a text in industrial hygiene for prospective workers.

Another new and high-class text for upper grades and high school but more general in its appeal and in its subject-matter, yet of very great importance, is Coleman's "The People's Health." This volume will be a good introduction to special industrial hygiene for those who go on into or through high schools and trade schools of secondary grade. The chapter headings will here again give an idea of the wealth of subject-matter available for vital preventive medicine in the way of education in general and industrial hygiene, namely: "The Need of Public Hygiene," "Fresh Air and the Prevention of Disease," "The Prevention of Disease by Pure Water," "Clean Milk and the Prevention of Disease," "Pure Food and Pure Food Laws," "Food Values and Economy in Food," "The Prevention of Infection," "Human Carriers," "Insect Carriers," "Hygiene of Work and Play," "Mental Hygiene," "A Sanitary Home," "School Sanitation," "The Public Health Department," "Health and City Life," "Rural Sanitation," "Industrial Hygiene," and "A Sound Body Conquers Disease." This volume is even more profusely illustrated with remarkably telling illustrations than the former.

Dr. Florence Richards has published also a practical "Hygiene for Girls," which is of the new order.

The Public School and the Public Health.—Here, then, we have a tentative programme for helping vocational education to enlarge its service, slightly beyond the giving of mere trade skill, to help the workers of the country meet in a healthy, vigorous manner these serious problems of life and attain genuine social efficiency so long held to be the aim of

education. It may seem a somewhat progressive programme, but it is not in any sense ultra. As Seager says in his "Social Insurance": "In the United States we are still so far from considering illness as anything beyond a private misfortune against which each individual and each family should protect itself as best it may, that Germany's heroic method of attacking it as a national evil through governmental machinery seems to us to belong to another planet." But this feeling will soon pass; and the governmental machinery we should chiefly use in this democratic country is the machinery of our public schools, especially our industrial courses and schools.[1]

[1] The State of Wisconsin has recently entered the field of public industrial insurance. This will soon show the condition of the working population with respect to health and will indicate a needed reform in vocational education.

CHAPTER XXIII

SEX HYGIENE AND SEX EDUCATION

Sex Education.—Sex hygiene is a term that has come into popular usage to indicate a phase of education which has escaped the attention of educators, owing to the ignorance of its importance as well as to the inhibiting force of tradition and taboo. In its general significance, it embraces all the themes which centre about the sex characteristics of the species. It has a special meaning to various teachers according to their basic interests. Some educators are carried away by the idea that merely teaching the facts of reproduction constitutes sex hygiene. Various other teachers and writers regard the facts concerning the social evil, the venereal diseases, or eugenics, as the main elements of information to be imparted in sex hygiene. These conceptions are obviously limited. While each constitutes one phase of the sex problem, it by no means encompasses the field of sex hygiene.

From the standpoint of education, the term sex hygiene is a misnomer. Sex physiology, sex pedagogy, or sex ethics would equally describe the educational content of a course of study designed to yield to youthful minds the body of facts essential for their wholesome development. The preferable and comprehensive term for the field in the mind of educators is sex education. This includes the natural training of children along normal lines in their duties and responsibilities for the development and maintenance of their manhood and womanhood, and involves preparing them for their highest duties as the potential parents of future generations. A slight knowledge of anatomy is essential. Physiology naturally must be interpreted in terms of hygiene. All instruction would fail

in effective results were it not based upon an intelligent understanding of sex psychology and sex ethics. The methods of imparting instruction would be blind and chaotic without a full appreciation of the methods and values bound up in sex pedagogy. Sex knowledge, sex understanding, and sex interpretation are equally indispensable.

Correlation of Sex Education with General Education.—Owing to the fact that the importance of sex education has suddenly dawned upon the educational world, it has been immersed in an unusually strong light, and singled out as an isolated subject free from correlation with the rest of the school curriculum. This unfortunate point of view, arising from the concentrated attention now bestowed on the subject, loses sight of the fact that sex education is not essentially a separate educational problem, but is intricately interwoven in the fabric of general education. Assuming that education implies the imparting of the facts, processes, and ideals essential for the development of effective citizenship, it cannot be denied that training for parenthood is involved in the general function of education. As courses of study are at present developed, there is a prevailing habit to omit all conscious references to the facts pertaining to sex, in so far as they may arise in the study and teaching of various subjects now included in the curriculum. It is patent that, to properly interpret mythology, a thoughtful mind could receive a wide education in facts pertaining to sex that would make no impress upon the youthful minds save as related to mythology. The interpretation of the literature of all nations involves a close attention to sex evolution, sex facts, and sex content that affords abundant opportunity for the gradual and normal inculcation of sex idealism. History, music, nature-study, sociology, botany, and biology are practically carriers of broad lessons in sex education which have largely been neglected, owing to the fear of polluting the child mind with sex facts tending to moral degeneration. Religious instruction itself, based upon the use of the Bible, cannot be ade-

quately developed without opening up to the child mind vistas of thought to be appreciated only in the light of an intelligent understanding of the vocabulary contained in the Bible itself. The Bible has not been utilized as its content warrants for the giving of sex education. Its use has been neglected almost entirely by the religious teachers in whose hands for centuries has been the problem of moral education of the youth.

The Problem of the School.—Considerable agitation has arisen over the suggestion that sex education be imparted to the young. The fundamental opposition has arisen from a failure to recognize that sex education is constantly being acquired by children. Furthermore, there has been a possible lack of understanding that the real problem does not consist in determining whether sex education should be given to children, but under what conditions and by which teachers. Ignorance and innocence in childhood, in so far as sex themes are concerned, are not one and the same thing. There may be chastity with a full knowledge and understanding of the facts of life, or there may be gross immorality without any true knowledge of the underlying physiology or hygiene of sex life.

The great problem for educators to determine is whether they are to assume the responsibility for the normal and healthful instruction of the young with regard to the facts pertaining to sex, or whether they are to continue to permit childhood to gain its information from corrupt and foul sources, from erotic literature, or from the evil traditions of the gang. Obviously, the teacher cannot shirk his responsibility, while education is deemed essential for the betterment of the human race. If through the error of centuries sex education has been neglected, despite its important educational value, then it is incumbent upon the teachers to realize the existent necessity for imparting sex instruction and to ascertain the methods best calculated to prove effective.

Sex education merits careful consideration because it is

an essential feature of the implied educational value of education itself. The taboo which has existed since creation is gradually being raised. The traditions involving different standards of morality for the two sexes have been the cause of great social waste and devastation, and are opposed to race progress. The church, the home, and the school have uniformly and consciously avoided giving the essential information for proper sex conduct, despite the fact that such neglect has brought untold suffering to humanity. In the inculcation of virtues, stress is placed upon honesty, justice, chastity, courage, kindliness, and honor, but in so far as these values are to be secured through a conscious appeal to sex psychology and sex control, education has been wofully silent and indifferent.

The basis of family life, as a unity for the development of society, is founded upon the development, direction, and control of the sex instinct. As the basis of love, physical or spiritual, the sex instinct demands guidance and development in the interests of racial progress. Unfortunately, the ordinary approach to the subject of sex education has been from the pathological side. A recognition of the horrors of the social evil, and an appreciation of the relation of the venereal diseases to blindness, idiocy, and racial deterioration, have served as the starting-point for demanding conscious sex instruction as a palliative measure. From this point of approach, it is easy to understand why teachers have feared to discuss the subject. The traditional barriers of modesty and fear have created a position so difficult that few teachers have had the courage to attempt to devise a method for dispersing ignorance and giving enlightenment as to the underlying facts necessarily to be imparted in order to lessen these social ravages.

A few educators, with an understanding of the more serious problems involved, have sought to discover the basic facts pertaining to sex which should be imparted to children, and have sought to devise methods for offering this instruction.

They have come to realize that a constructive plan of sex education, pedagogically analyzed, involves a full recognition of the part that sex plays in social development and personal progress.

As a result of analysis, sex education no longer can be regarded as a special subject isolated from the rest of life. Sex hygiene is bound up in all the subjects of the curriculum. Because of the attempts to isolate it from the other subjects in the curriculum, it has assumed a monstrous form, astonishing and stupefying those seeking only the dangers in the imparting of sex instruction. If sex education were to be classified as a specific carnal subject, it would present most tremendous difficulties. Constituting a part of general education, however, it so sinks its identity in the various subjects now taught as to deprive it of the dangers and salacious tendencies so greatly feared. Sex instruction should be approached in a normal manner, evaluating sex facts in terms of the child mind. The great obstacle to giving such instruction has arisen from the fact that adults rich in experience, saturated with tradition, and conscious of sex physiology have failed to appreciate the spiritual, ethical, and scientific values of the subject as they may be developed in the plastic and undefiled minds of children. Pedagogical hesitancy has been founded upon a failure to interpret the facts, the processes, and the ideals involved in sex education in terms of children's understanding.

Sex Education According to Stages of Child Development.—It is patent that sex education is neither a special subject nor one limited essentially to any period of child development. Virtually, sex education is a constant process extending from infancy to maturity and even until senility. The methods devised for instruction in literature, mathematics, history, and nature study naturally vary at different periods of the psychological development of children. Similarly, the methods employed in imparting sex instruction must vary according to the age, sex, family environment, nationality, sex precocity,

and mental development of children. For the purpose of convenience in considering educational methods to be employed, it has been suggested by a committee of the American Federation of Sex Hygiene that the matters and methods of sex education should vary according to more or less definite age periods, as, for example: one to six years, six to twelve years, twelve to sixteen years, and sixteen years and thereafter. From the standpoint of the psychological development of children, regardless of distinct chronological limitations, I have suggested that the matter and methods of sex education be divided according to three stages of child development, which I have termed the age of mythology, the age of chivalry, and the age of civic awakening.

The age of mythology constitutes that period of child life that is particularly keen in imagination. Mentally, the fairy-tale, the romance, the animal story, and nature wonders supply the best intellectual pabulum.

Gradually the child outgrows the age of mythology and enters the age of chivalry. There is no sharp line of demarcation of the two periods, nor can any age be given when the transition occurs. The age of chivalry really begins as a prepubertal period. For purposes of convenience one may regard it as embracing the years from eight to fifteen. Each child, however, is a law unto himself, and the specific period of his life that represents the age of chivalry can only be determined by noting the physical and psychological development of the particular child.

The child's body is beginning to take on new growth, the sexual functions are beginning to expand, the emotional side is unfolding at a very rapid pace. The actual expression of the sexual development may be marked by the intensification of affection for the family.

The period of civic awakening in turn marks a further development of character. The child in beginning adolescence appreciates that he is part of a community. The world of ideas has expanded. No longer is the sharp focus on himself. His thoughts are less centripetal. There is a realization of the world outside of the home and a recognition of the fact that competition is going on in it.

The awakening is, however, all designed to view the future. The understanding of the relation of the individual to the community or the state is slowly coming to play a part in the individual's life. How wonderful becomes the sense of power on realizing that each individual

is laden with responsibility for the health, morals, and progress of many others! Not preservation of self for self, but self-preservation to protect others, becomes a new incentive. The selfish idea in the prevention of disease, physical or moral, takes on an altruistic aspect. Self-happiness at last begins to recognize that it includes and depends upon the happiness of others.

Bearing in mind this artificial classification, it is obvious that sex education is a complex problem meriting thorough investigation with a view to determining the scope of information to be imparted and the methods for its presentation.

Despite the fact that sex education appears to be an imperative need, I do not believe that for many years to come it will be regarded as a definite subject. Attempts have been made to legislate it into the school curriculum, but thus far it has been forced into only a few high schools, and sufficient time has not elapsed to judge of its effect. In view of the history of compulsory teaching as related to alcohol and tobacco, it seems inadvisable to suggest that sex education should be made the basis of mandatory instruction. It is unwise to give to the subject an abnormal position in the category of school studies. Dangerous results would surely ensue if fanatics, impressed with the importance of this subject, should endeavor to compel its instruction in the elementary schools previous to a complete understanding of its function there. Carefully devised methods must be thoroughly tested out under normal conditions. While sex instruction must be regarded as an essential phase of educational development, it must not be viewed as a dominating force in education nor as a basic subject of cultural value or of mental development. Its highest significance lies within the realm of ethics and the development of self-control.

Who Should Teach It?—Recognizing the practical importance of sex education, one immediately faces the question as to who should teach it. It requires no special evidence to prove that the responsibility for sex education has been shifted in turn upon the church, the home, and the schools.

In so far as the fundamental facts in sex education are to be acquired previous to school age, it is manifest that the responsibility for laying this foundation rests upon the home. Parents, however, have not been keenly alive to the necessity of this preliminary instruction, nor do they feel themselves particularly fitted for undertaking the task. Parental timidity is largely responsible for the sin of omission. Attempts to arouse parents through the medium of the school would undoubtedly awaken their consciences so that they would respond to the appeal to give the necessary facts along the lines suggested by capable teachers. Parents are particularly capable of giving natural instruction, once they appreciate their opportunities for such instruction in view of their familiarity with the vocabulary of their children, their companions, and their general experiences.

In the school itself the difficulties of giving sex education are multiplied by virtue of the size of classes, the mixture of nationalities, the variations in age, and the diversity of sex experience. Coupled with these difficulties are the lack of training among teachers and their consequent reluctance to impart sex instruction.

The Training of Teachers.—A great problem arises as to which teacher should give instruction, particularly viewing sex education as a specific subject. There should be no specific teaching of sex education below the seventh grade in the elementary schools. The great problem, therefore, is to train all grade teachers as to the methods of imparting the general sex content of all the subjects in the curriculum in a normal and constructive manner without making it appear that any unusual topic is being discussed. To achieve this end, some training-schools for teachers are engaged in developing courses for teachers that will give to them the broad vision necessary for understanding the place of sex education in the public schools and will acquaint them with the facts which should be developed from the general subject-matter and the methods of presenting them to the pupils.

In the higher classes where departmental systems exist, or in the high schools where children are at puberty or in adolescence, there is a more general effort to devise definite lectures upon specific sex themes of informational value and moral force. Various teachers claim that the best instructors are the directors of physical training, or the biologists, or the teachers of nature-study, or the school physicians or school nurses. When specific instruction is indicated, the greatest stress should be placed not so much upon the subject that is taught as on the characteristics of the instructor. Tact, sympathy, understanding, and example are of equal importance to the possession of the facts to be imparted. In possession of the knowledge to be disseminated, a teacher of Latin, history, or mathematics might be preferred as the definite instructor of the specific problems related to adolescence rather than a blunt, unsympathetic, or callous teacher in biology, physical training, or medicine. The basis of selection of a teacher in sex education should include the personal elements entering into teaching ability as well as the recognition of the general educational power of the teacher. Obviously, the teacher to whom is to be intrusted the careful process of sex education must be possessed of a knowledge of the matter to be presented, the methods of presenting it, and a broad comprehension of the relation of the subject to human effort and efficiency. He must possess judgment to determine whether information should be given to individuals or to groups and be able to weigh the effects of his instruction. Sex education must be achieved without the development of sex self-consciousness and without the stimulation of erotic ideation.

Sex Instruction in the High School.—Considering sex instruction as one of the factors in character formation, it is obvious that the place of sex education in colleges scarcely requires consideration in this chapter. The position of sex education in the high school appears to be definitely determined. As normal boys and girls have acquired a large

measure of their sex lore before puberty, the informational character of sex education in the high schools must possess a correctional bent. The vast amount of misinformation acquired from the streets and the gang—pornographic literature, pathological booklets, and false interpretations of current events as described in the press—has made its impress upon adolescent minds. A careful pedagogical effort is necessary to eradicate or modify the false impressions and to give the definite and accurate information that will raise the plane of sex information far from its low level.

With some limitations, sex education in the high school possesses a prophylactic value. The young adolescents, conscious of new physical sensations and emotional stimuli, require careful guidance so that the interpretation of their physical and emotional development may be sanely directed toward high ideals. The more mature students in the high schools, even in the first year, who perchance have drifted with the current and possibly have succumbed to influences dangerous to their physical and moral welfare, need to be rescued. For them it is essential to secure a broader vision of life. The facts pertaining to sex must be placed before them in a clean manner to indicate the dignity of manhood and womanhood and to give them an understanding of their duties and responsibilities in the light of their social obligations. The possibility of developing character during adolescence so as to lessen the likelihood of immorality demands the careful instruction of high-school students in the facts pertaining to sex. This is not a difficult matter for a tactful instructor, inasmuch as most of the youths have acquired a large share of sex information, though in terms of vulgarity and obscenity. With the development of the social consciousness at puberty, it is possible to mould character on the basis of an appeal to family pride and social responsibility. The mere presentation of facts relating to anatomy and physiology will not suffice to produce the moralizing result to be sought. In the high schools it is possible to give a few definite lectures, collating

the facts previously imparted in a normal way and dealing with the definite sex problems surrounding adolescence.

The *ethical* lessons involved in sex education assume the utmost importance. Considered from the standpoint of biological development, physical education, civics, and ethics, the high school may afford definite instruction upon the meaning of puberty and the relation of the sex instinct to personal success and physical health. The wider problems of the relation of chastity to family welfare, eugenics, and racial advancement can be discussed without equivocation, provided that undue stress is not placed upon the venereal diseases and other pathological phases of the subject. To seek to inspire fear and to establish character upon this principle is poor pedagogy. The attempt must be made constructively to create the ideal and desire for clean living and self-control on the basis of a positive knowledge of the essential values of sex facts. The dangers of sex education in the high schools are practically negligible, provided that instruction is placed upon a high biological, ethical, and social plane. Its function is to further the development of social responsibility rather than to elucidate the merely personal phases of sex problems.

Sex Instruction in Elementary Schools.—In elementary schools the position of sex education is different. It is desirable to present sex knowledge to children before adolescence without drawing attention to the fact that such instruction is being given. The essential nature of puberty may be appreciated before this physiological epoch is reached. It is necessary to consider each school system as a unit in order to determine in which grades sex instruction should be given and to what extent and in what manner the facts should be imparted. The variations in classes due to numbers, differences in age, nationality, and sex precocity increase the difficulties of definite sex education even in the upper grades of the elementary schools. If, however, sex education is regarded as essential to the welfare of future citizens, it is man-

ifestly important that such education should be given to the maximum number of children, and, since most pupils never reach the high schools, this becomes possible only through instruction in the elementary schools. It is possible to lay the foundations of a rational sex education in such a manner that elementary-school children will not leave the schools, as at present, entirely ignorant of the great importance of the sex instinct in the affairs of the world.

Naturally, in imparting special instruction, particularly for those who are about to leave school in order to go to work, the sexes must be segregated. Within the sexes, groupings should be made not so much on the basis of chronological age as of psychological age. The differences in sex precocity make it difficult for teachers, save those of the wisest discretion, to give instruction in such a manner as to preclude the augmentation of self-consciousness.

The barriers of modesty and shame, having arisen in child consciousness just before puberty, increase the difficulties of sex education at this period of school life unless one recognizes that directness of speech, frankness, and sympathy are essential in order to overcome temporarily these barriers without breaking them down. The proper grouping of children, therefore, is imperative. For this purpose the advice of all teachers must be secured even though the instruction be given by one teacher. Frequently it is advisable to omit from the group some children whose morals are believed to be impaired in order to give them individual attention that their instruction may be gauged according to their experiences and needs.

Individualized sex instruction, while theoretically desirable at times, is practically impossible in a public-school system, save in connection with problems of discipline or in response to requests from parents for the imparting of such individual instruction. The disadvantage of individual instruction as opposed to group instruction is that it may tend to accentuate the peculiar qualities of the instruction given,

whereas the group instruction makes it appear to be a normal part of education to be received by all and does not serve to build up an overweening false modesty.

All steps leading to the introduction to sex education must be taken *slowly* in order that public opinion may constantly support the movement. The conservative position of the public is perfectly natural, particularly in the light of the opposition of teachers toward the introduction of this subject. Of *primal* importance is the education of the public as to the meaning of sex education, the necessity for its introduction into the schools, and the educational methods utilized by teachers. *Second*, it is a vital necessity that teachers be given a proper understanding of the purposes of sex education and receive training in the matter and methods essential for the proper teaching of the subject. *Third*, training-schools for teachers must organize definite courses for the adequate training of those who appear to possess special fitness for the presentation of the facts relating to sex problems. Such courses naturally must be developed on the basis of biology, natural sciences, physiology, anatomy, hygiene, zoology, and ethics. The greatest need at the present time is the preparation of teachers of this subject. It has been urged by some that sex instruction by any type of teacher would be preferable to the present system of educational neglect. While there may be some merit in this argument, it loses sight of the fact that improper pedagogical methods may do incalculable damage by destroying modesty, lessening shame, inspiring fear, and stimulating erotic desire.

Dangers.—The dangers of early instruction in sex facts may arise from:

(1) *The Accentuation of Pathology.*—To focus all attention upon the venereal diseases and the resultant personal or social damage is to build up a morbid spirit and develop a phobia or encourage an obsession leading to various nervous phenomena prejudicial to mental balance, physical health, and moral stability. The morbid phases of sex should be

relegated to the background and introduced as secondary phases of sex education. This is possible without any sacrifice of the content of the subject and with distinct advantage in its effect upon mind and character.

(2) *The Stimulation of the Sex Instinct.*—The method of imparting instruction should be totally impersonal. Facts should be presented in their widest relations without making it appear that any particular individual is being considered in the discussion. The sex instinct should be presented as a normal part of child nature with attributes that lead to the development of manliness and womanliness and that stand for the higher virtues. The sex instinct should not be referred to as a purely physical phenomenon whose main purpose is simply reproduction. All references to the physiology of sex may be interpreted in terms of social function rather than personal function. Scientific terms should be used wherever necessary, and all descriptions of processes should be given in plain terms similar to those employed in teaching botany and zoology. By keeping the discussions on the plane of biology and universal facts, the likelihood of stimulating the sexual instinct is decreased.

(3) *The Stimulation of a Morbid Imagination.*—By unfolding all the mysteries of life in a sympathetic and dispassionate manner, all the facts pertaining to sex development are revealed. The imagination must not be appealed to, nor should there be any hesitancy on the part of the teacher in the exposition of facts that will permit an appeal to imagination. Descriptions, details of processes, expositions, and reasoning should be sufficiently complete, direct, and impersonal to allow no room for imaginative processes. The present need for frank sex instruction is largely due to the fact that the erotic imagination of children receives no conscious check but is constantly stimulated through their inability to clear up the magnified mysteries.

(4) *The Development of Self-Consciousness.*—Tactless instruction, with personal reminiscences, or the direct considera-

tion of personal problems in the group, tends to develop self-consciousness. This is an undesirable method and creates hostility on the part of children struggling with their own emotions and unable to consider the sex facts save in terms of their own personality. At times it may create unnecessary fears and lessen self-confidence, create a feeling of self-depreciation, and tend to offset the upbuilding value of the instruction imparted.

(5) *The Breaking Down of Sex Barriers.*—Among the normal protective devices are certain psychological barriers, such as modesty and shame. No instruction should be given which would tend to undermine the force of these barriers. A vast distinction must be made between false modesty and false shame and the more substantial psychological attributes. To decrease modesty or belittle shame is to destroy valuable factors in conserving or upbuilding strong morals. The presentation of the facts relating to sex phenomena must therefore take into consideration these barriers with a view to strengthening them instead of undermining them.

(6) *The Encouragement of Sex Conversations.*—Obviously, at the present time matters pertaining to sex constitute no small part of the general themes of conversation of boys and girls at school. By destroying the secret nature of sex themes there is a tendency to decrease the importance of such topics of conversation. There would probably be less harm in conversations dealing with sex matters were they founded upon proper information and ideals than under the present system of vulgarity, imaginativeness, and secrecy. At the same time, every conscious effort should be made to decrease discussions of sex themes based upon misinformation, obscenity, indecency, and licentiousness.

(7) *The Creation of Curiosity.*—There can be no question that curiosity is a normal attribute existing with undue force as related to sexual matters. A rational exposition of the problems of sex tends to allay curiosity and not to stimulate it. The creation of stronger self-control, founded upon basic

knowledge, serves to relieve the pressure of curiosity and affords a valuable safeguard against its overdevelopment. Careful teaching will not create an abnormal interest in the subject, but it will simply serve to guide and direct the normal and basic interest with an array of facts and reasons which enables it to be satisfied far better than under the present system where interest is forced by secrecy, gang influence, and vicious literature. Eroticism becomes subordinated to a healthful interest and a conscious appreciation of the meaning of sex in relation to life.

Methods.—The method of instruction in matters pertaining to sex is practically to impart such knowledge of sex at each period of child life as may be valuable and necessary for preserving health, developing high planes of thought, and controlling conduct. Recognizing the fundamental facts essential for the health and morality of the community, it seeks to build up normal human beings of high ideals and good moral character with the fundamental facts enabling them to make an intelligent choice as to action. The point of departure in instruction must be the normality of sex life and the normality of the sex instinct. The problems of pathology are of secondary importance. Anatomy should be dwelt upon as little as possible and embryology should be involved only in so far as may be necessary for the interpretation of the reproductive phenomena in all the plant and animal kingdom. The scientific processes are to be found in the biological interpretation of nature-study, supplemented by the values to be gotten from physical education, civics, hygiene, history, and ethics.

In methods of instruction there is a positive phase which has to do with the development of the child and a negative phase which deals with the child's environment. It is obviously impossible for a school to control a child's environment, nor is it within the bounds of possibility to safeguard children from all contacts with demoralizing and corrupting influences in their environment. Instruction as to the im-

portance of bathing, correct methods of clothing, the values of physical exercises, athletics, and recreations of a wholesome character, is within the limits of sex instruction in so far as it is related to environment. Guidance as to theatres, gambling, alcoholism, debasing associates in the gang, the advantages of playgrounds, parks, libraries, the importance of religion, the necessity of cherishing home life and maintaining confidences with parents, properly may be included in a constructive programme of sex education involving the environment of children.

In the positive education of the child, character formation is the ultimate aim. In the study of reproduction during the adolescent period, utilizing the facts to be gleaned from biology, the ethical implications require greatest emphasis. The evolution of human love, the relations of parenthood to family welfare, and the nature and importance of the home, together with the ethical relations which should exist between parents and children, are ethical and biological concepts of exceedingly great value in making appeals to adolescents.

Gradual Development.—The entire subject-matter of sex education must be developed gradually. The subject must be evolved. The spontaneous exposition of the great truths must not be permitted. Sex education must cover a long period of years and one step should be based upon previous educational supports. The study of reproduction in plants and animals covers a period of years in teaching and, when based upon familiar plants and animals, affords abundant facts for indicating the analogies in human life. The purposes of sex education are not merely to be informational in character but to yield sufficient material for character training. Mere facts in themselves present few motives for conduct. The trend of sex education must therefore be in the direction of creating definite high motives of altruistic character. Obviously, the form of instruction given in night-schools to adults may consist of a broader treatment of the human aspects of sex problems. Among the adolescents,

however, the inspiration of high ideals of sex conduct must form the end and aim of the instruction.

Judgment, tact, sympathy, and understanding are requisite in order properly to balance the biological facts with the ethical concepts so that instruction may not appear to be preachment, and so that the basic facts may be presented before the essential temptations of youth have begun to assail the child mind.

The use of charts and illustrations merits careful consideration in order that they may not present more material than the child can assimilate in connection with the particular subject under discussion. The use of books relating to sex education by the children is to be deprecated until adolescence is well advanced. The value of sex education is enhanced through giving adequate information without creating an inordinate interest or awakening an abnormal curiosity as to numerous questions, such as would naturally be developed through the employment of books which cannot be adapted in scope or method of presentation to fit large groups of children in the preadolescent stage.

Without going into details as to the great number and variety of facts to be imparted, I may repeat that the connotations of literature, history, and civics must be combined with the facts of biology, nature-study, and hygiene and interpreted in terms of ethics and sociology. During the early ages, sex facts must be intellectualized in order not to emphasize the developing emotional phases of child nature. During puberty, when emotional waves are fast rushing upon the child mind, they must be harnessed and directed into channels that will do the most good and least damage. The physical phases of sex problems should not be stressed for adolescents except in so far as they are spiritualized. The intellectual appreciation of the facts presented merely furnishes the basis of educating the emotions. The normal development of sex themes proceeds in three stages: first, the intellectual acquisition of facts; second, the interpretation of emotional life;

third, the spiritualizing of sex consciousness. These three stages are not totally dissociated at any period of child development but must be most closely interwoven in the instruction during adolescence and thereafter.

Education of Parents and Public Opinion.—There are frequently times during elementary-school periods when special problems arise requiring specific instruction to be given to individual children. This must be done frankly and honestly, whether it deals with masturbation or gross immorality. The frank discussion of topics involved in school discipline carries with it the obligation to discuss them also with parents in order to secure the most effective results. While parents represent the persons upon whom rests the responsibility for sex education, the school cannot ignore the fact that parents are ignorant of the best methods of pedagogical procedure. For this reason it is highly desirable that schools, through the medium of mothers' clubs, parents' associations, or general public lectures, should afford an opportunity to parents to receive instruction upon the necessities of sex education, together with pedagogical methods and the material required at different ages of child development. Particular advantage accrues from giving the instruction to mothers in connection with the clubs of kindergarten mothers during the first year of the child's attendance at school. Herein is a wide field of usefulness of the elementary school, bringing the school and home in closer co-operation and harmony in the interests of sex education of the young.

In the broad problem of developing a rational public opinion that will countenance the freer discussion of the serious hygienic and moral dangers involved in the present attitude of indifference or neglect, the school has a tremendous responsibility. Under school auspices parents may be educated to higher ideals and to a more healthful appreciation of the importance of conveying to the young a knowledge of the sacredness of human development. The school can indicate the sociological importance of sex morality. In ad-

dition to this, the school will foster a broader concept as to the ethical import of sex education and its relation to the welfare of future generations. This may all be given constructively without emphasizing pathology.

The Need for Trained Teachers.—The crying need of the present time is the training of capable teachers in this line of educational endeavor. Training-schools must adjust their courses to the future needs of the community. The process of introducing sex education into the public-school system should proceed slowly and advance no more rapidly than the education of teachers. This does not mean the creation of a new set of specialists in sex themes. It involves merely imparting an accurate knowledge of the essential biologic facts, together with the inculcation of tact, understanding, and skill in presenting the facts in a sympathetic manner that will make an impress upon the minds of children in the course of ordinary instruction. For the presentation of specific themes in sex instruction broad vision is essential, with a clear understanding of the psychology of sex, together with the variations in child psychology according to the degree of physical, mental, and moral development.

Conclusion.—Thus it is patent that the educational aims of sex instruction are to supply adequate information to serve as the basis of conscious reasoning with a view to stimulating the will to more effective self-control. Modesty, chastity, courage, pride, honor, and self-control are normal ends. One seeks to subordinate self-assertion in individualism by the development of social responsibility and a willingness to submit to self-discipline. The function of sex education is to preserve health, develop right thinking, and control conduct. Its educational values are biological, physiological, psychological, hygienic, and pedagogical. Sex education should determine the evolution of sex character on the basis of the direction and control of sex characteristics.

CHAPTER XXIV

PLAY AND RECREATION AT THE RURAL SCHOOL

Country Life and Physical Education.—There are three general methods of physical education—work, play, and gymnastics. In the city, physical education is mostly through play and gymnastics; in the country, through work and play. It is impossible in these days of swarming germs for any one always to dodge them, to run away from them, or to hide from their presence. We cannot filter all the air or sterilize all the water or disinfect everything we touch. It is of the greatest importance that we should develop positive vital resistance or in some way prepare the body to fight the germs it cannot avoid. But far more important than the avoidance of disease is the developing of that positive side to health, which on the emotional side means joy and vivacity, on the intellectual side means sanity and optimism, on the physical side means sprightliness and the joy of living: the sort of thing that children so often express in their hippity-hop as they go down the street. It is essentially the spirit of play vitalizing the personality.

In the building up of the positive side of health, the country has certain advantages: pure air, plenty of physical activity, fairly good water, and an abundance of food. On the other hand, none of these things are at their best at the rural school. Probably the majority of rural schools have no very satisfactory method of ventilation; there is much dust from the floors and blackboards; the air is seldom humidified; the water supply is seldom satisfactory; and the lunch is nearly always cold. If school hygiene is to be on the same basis as other school subjects, however, it must not be for the school alone but it must establish habits and enthusiasms that

will maintain the health in years to come. It is believed that all habits of play in the open air tend to do this.

The Work Fallacy.—It has been generally held in the past that country children did not need physical training because they got the necessary physical development from the work of the farm, but it must be remembered that the work of the farm has been almost completely transformed in the last half-century. From being a day laborer the farmer has become a mechanic and a scientist. He has no more forests to clear. He is ceasing to hold the handles of his plough about stumps and stones. Ploughs, cultivators, rakes, mowers, and reapers have all become vehicles to carry him about his farm. Driving a team is usually not strenuous exercise. So far as the boy works with his hands, it is apt to be hoeing in the garden or pulling weeds. Such work frequently tends to cramp the chest and to bring the shoulders forward. While farm implements have seats, the seats usually have no backs, and the farmer is apt to sit collapsed. There is very little work on the modern farm, with all its machinery, that can develop the heart and lungs, as did the chopping and mowing and cradling and pitching of hay and wheat of pioneer days. Physical strength is becoming relatively less important on the farms as elsewhere, while vital strength, which consists essentially of the strength of the heart, lungs, sex, nerves, and digestion, is no less important now than formerly. Country boys and girls are apt to be round-shouldered and flat-chested, with forward-slanting heads. Boys who have done much hard work are usually awkward and clumsy, almost without that grace and suppleness that are characteristic of a child who has been trained through play. Country children generally have more stable nerves than city children. Their digestion is commonly good. But they are apt to be deficient in lung capacity and heart development.

Play at the Country School.—So far as the rural school promotes physical education, it is almost entirely through play and athletics. There are practically no gymnastics in

country schools in America, though they take a considerable time in the scheme of the rural schools of Germany and Denmark. Play is more needed at the rural school than at the city school. Throughout the country the farms are getting larger. The families are small and are growing smaller from decade to decade. It is becoming increasingly difficult for the country child to play anywhere except at school. He can practically never play team games anywhere else, or other games that take a considerable number of players. The farmer is apt to say his boy does not need to play baseball because he gets plenty of exercise at home, but play is needed at least as much for mental health as for physical health in the country. Play must give grace and suppleness, strength of heart and lungs, correct physical defects, give resistance against disease, establish hygienic habits, and create the joy of life. It is more needed at the country school than elsewhere, because it is almost the only chance the country boy has to play, and because the rural school must introduce the spirit of play into rural life, which has grown so serious and hard that it is driving the boys and girls, and even the farmers themselves, from the farms.[1]

Larger Grounds for the Rural School.—If the rural school is to deal effectively with its problem, the first requirement is a larger ground, and a ground that is suitable for play. Institute work and lecturing take me into nearly every State in the Union and everywhere I find nearly the same conditions. Usually the yard is not more than half an acre in area. It is often evident that it must have been selected for a playground because it was good for nothing else. Very seldom indeed is there any attempt to make it attractive with fences or vines or trees. In less than one per cent of the grounds is there any play equipment. Great interest is manifested in educational circles just now in the improvement of the rural school, and it may fairly be said in a large way to occupy the centre of the educational stage. While the percentage of

[1] See Curtis, "Play and Recreation for the Open Country" (Ginn).

country children to city children is decreasing from year to year and faster than the percentage of rural adults to city adults, the majority of the children are still educated in rural schools. There are probably at present only about one hundred and fifty counties in this country where there is any systematic attempt to organize play for country children. An appreciation of the need is becoming general, however, and we may expect great improvement in the near future. State departments are now often recommending that rural schools get two or three acres as a minimum area for school sites, and in some States they are practically compelling playgrounds of such size, by refusing otherwise to approve of the plans. The State of North Dakota by law now requires two acres as the minimum for rural schools. This demand for a larger ground springs from a desire for a larger use, so there is every reason to expect that there will be more play and better play at the rural school in the future than there has been in the near past, at least.

The Consolidated Rural School.—All rural educational progress is moving in the direction of the consolidated school. With the depletion of rural population and smaller families many of the once populous one-room schools now have only five to ten pupils. It is expensive to hire a teacher for these few. Everywhere agriculture and domestic science are coming in, and it is almost impossible to teach these at the one-room school. But to my mind the most weighty reason of all for consolidation is a *social* one. Country children are diffident and backward on account of a lack of acquaintanceship. More than any other child the country child needs to go to a large school. The school offers the only opportunity that country children have to play team games, and ofttimes there are not enough children at the one-room school to play. The boy in America who has never learned to play baseball is quite as much handicapped as the boy who has never learned arithmetic. The great handicap of the country is its isolation, and the natural cure of that isolation is a social

centre where the people can come together. Probably the consolidated school is the best social centre that a rural community can have. There are several States that now give special State aid to consolidated schools, and the movement is well advanced in many States.

At the consolidated school there is usually a good-sized playground. The average area is probably not less than four acres, as the grounds are often ten to twenty acres in size. In some cases there is an attempt to have a township picnic-grove and ball-field at these grounds also. On these grounds there is opportunity both for the play of the school-children and of the young men of the community as well. The consolidated school makes possible most of the things that are essential to the welfare of the rural community.[1]

Better Games.—If play is really to meet the need of physical and social training in the country, there must be better games. We usually think of baseball as the one game for boys, but baseball is not adapted to the one-room schools of the country, because it requires more ground and more older boys than there are at these schools. Probably less than one per cent of them have eighteen boys who are old enough to play baseball. Baseball at best has a narrow age range, from about twelve to twenty-five. It does not meet the need of the girls at all, and the girls need the play far more than the boys do because they get so much less open air and play than the boys at best. *Indoor baseball*, with its smaller diamond, fewer players, and large soft ball, is a much better school game than baseball, because it does not require so much room and because it has a far wider age range, as it may be played by any one from eight to sixty. It has a far wider time range, as it is played in the fall as well as the spring, and in the late fall and early spring when the sting of a hard baseball would be insufferable. It is played by the girls nearly as much as the boys, and, as it has a very much smaller

[1] See Monahan's bulletin on consolidation by the U. S. Bureau of Education.

field, it can be played very comfortably with five players on a side. Indoor baseball is played mostly out of doors at present, on a thirty-five-foot diamond.

Probably the best game there is for the rural school is *volley-ball,* a game played with a large inflated ball over a tennis-net or rope. This game has several very great advantages. Most country children are stooped and round-shouldered; volley-ball requires the player to keep his head and shoulders back and is a natural corrective of these bad positions. Volley-ball is played by the girls as much as the boys, and, as was said before, the girls are the great problem. Country girls seldom learn how to play any athletic games, as the tradition is that vigorous play is unladylike. Girls at fourteen have only three-quarters the lung capacity of boys of the same age. Blood tests always show their blood to be in poorer condition on the average. The German figures, given by Schmidt, indicate that tuberculosis is about 25 per cent more prevalent among girls than boys in Germany. Volley-ball can be played fairly well with two players on a side, and even the one-room school will usually have at least four children who are eight years old or older. Volley-ball has the widest age range of any of our games except golf, as it can be played very comfortably until the player is seventy. It thus not merely meets the needs of the school years but of later life as well.

There should be *croquet* at the country school, because croquet is a good country game and the school must introduce it into the community.

Tennis is another game that is in every way suited to the country school and the country community, and it should be played at the school, if there are older scholars, for the same reason that croquet should be, in order to introduce into country life and custom a game that is suited to the children and adults alike. Tennis is the country game of England. It takes too much land for the city, but is in every way suited to rural conditions.

If the school is very small indeed, say three or four pupils, *tether-ball* is probably the best game of all. Of course, there are many games of lower organization, such as *prisoner's base* and *pull-away*, that the children should also play.

In introducing games, *only one new game should be started at a time*, and this should be played until the children have become skilful and begin to tire of it before another game should be started. There should always be an attempt to secure permanent teams and to keep the score from day to day. Scrub teams never get anywhere. They do not secure practise or inspire loyalty. In order to get any new game started it is almost necessary for the teacher to play with the children continuously until some little skill is acquired. There are four sizes of the indoor baseball. If the ground is of good size, the fourteen-inch ball is usually preferred by the children. But in small grounds, especially where the children wish to play long ball also, as they usually do, the seventeen-inch ball is best. In prairie countries, where high winds are common, the seventeen-inch baseball is more serviceable as a volley-ball than the regular ball. It can also be used very satisfactorily in playing dodge-ball and a number of other games. The rules for volley-ball and indoor baseball can be secured of any athletic supply house. For general games consult "Games for the Playground, Home, School, and Gymnasium," by Jessie Bancroft; "Education by Plays and Games," by George Johnson; and "The Teaching of Play," by W. P. Bowen.

Play Equipment.—School people are apt to think that the introduction of play into the school means the erecting of swings, giant strides, see-saws, etc. In matter of fact, such equipment is of minor importance and may be omitted altogether without seriously handicapping the work. In the organization of play, the first thing to do is to furnish the equipment for the games. A baseball is essentially communal property. All the members of the two teams that play with it use it alike. A boy cannot be expected to furnish base-

balls to the school, and of course the same is true of bats, volley-balls, and many other similar pieces of apparatus. If the school wishes to encourage baseball or volley-ball, it must furnish the balls and other equipment. This is by far the most important apparatus for any playground. Of course, the pupils may co-operate to purchase such equipment or other means may be invented for raising the necessary money.

Second in importance comes the equipment for such athletics as are suited to the rural school. There should be a horizontal bar with sand underneath, where the boys can chin and do stunts. All boys like to perform on a horizontal bar, but if it is over the hard ground there are likely to be serious accidents. There should always be a jumping-pit filled with sand and with a take-off board set plumb with the ground. Children between eight and twelve are probably more fond of running and jumping than they will ever be again. It is well to have the distances marked in feet and half feet on the side of the pit. There should be the standards for the high jump as well, as the children are rather more fond of the high jump than they are of the broad jump. Somewhere at the side of the ground or along the road, if it is level and in good condition, a sixty and one-hundred yard dash should be marked off. Children all delight in these contests. A stop-watch adds very greatly to the interest in running, but children love to run against each other even if they do not know their time. A race that is more than a hundred yards is seldom wise at the district school.

For various reasons, the swings and see-saws cannot make the same bid for school support that the equipment that I have mentioned can. A baseball is meaningless as individual property. A boy cannot play baseball alone. A swing is usually individual property, as only one or two children can swing at a time. The swing causes many quarrels and accidents. It is relatively expensive, and hard to take care of. It gives no social training and little physical training. The country child is with companions all too little. While he

is with them he should play social games that he cannot play at home. The swing and the see-saw belong properly at home and not at school. The only reason why it would be worth while to install them at the school at all is in order that the parents may be encouraged to put them into the dooryard. It is probably well to have a sand-bin for the little children, though this also belongs rather to the home than the school.

If the school directors are not willing to furnish the equipment that is needed, the school itself can usually do it by holding an entertainment. This entertainment will probably be also a valuable social occasion to the country, will make the teacher acquainted with the parents, and will be a real education for the children in social service. Forty-seven such entertainments were held in Winnebago County, Illinois, last year, which yielded on an average a little more than thirty-five dollars apiece. This is ample for the play needs of a rural school for a year or more.

The Standard Athletic Test.—The standard athletic test was designed by Doctor Gulick while he was director of physical training in New York City. It is practically a pass mark in physical training. By the time a boy is thirteen years of age we expect him to be in the seventh grade. The test says that by this time he should be able to chin a bar four times, jump five feet nine inches standing, and run a sixty-yard dash in eight and three-fifths seconds. We all tend to come up to standards if we only know what they are and what is expected of us. The test should be carried on to the adults. This test was tried out in Ulster County, N. Y., upon the country children. The farmers thought in the beginning that anything that city boys could do would be "pie" for sturdy country boys, but were surprised to find that scarcely a boy could pass the test. This set the boys to practising all over the county, with the result that many were able to pass before the year was over. In some places it is customary to let the boys try out in one event at a time, taking possibly first the chinning, then the jumping, and finally the running.

In other places they require them to practise all the events together and do the three stunts at one test.

The new standards and rules may be had from the handbook of the Public School Athletic League issued by Spalding, or from the Playground and Recreation Association of America at No. 1 Madison Avenue, New York. The new test is a graded test as follows:

FIRST TEST

Pull-up (chinning)	4 times.
Standing broad jump	5 feet 9 inches.
60-yards dash	8⅘ seconds.

SECOND TEST

Pull-up (chinning)	6 times.
Standing broad jump	6 feet 6 inches.
60-yards dash	8 seconds.
Or 100-yards dash	14 seconds.

THIRD TEST

Pull-up (chinning)	9 times.
Running high jump	4 feet 4 inches.
220-yards run	28 seconds.

The following general rules shall govern the final competition:

No boy is permitted to receive more than one badge for any grade in any one year.

It is necessary to qualify in all three events in any one class in order to win a badge.

There shall be but one trial in chinning, one in the dashes, and three in the jumps.

Beautiful bronze badges have been designed by Professor R. Tait McKenzie, of the University of Pennsylvania, for the winners of these three tests. These are furnished by the Playground and Recreation Association for fifteen cents each.

Interschool Contests.—The best place there is for interschool contests is at the rural school. In our great city high

schools we have the spectacle of eleven sturdy young giants on the gridiron getting much more exercise than they need, while all the weaker ones, to whom football might have been a life-saver, sit on the grandstand and shout. If the rural school is to hold contests with other schools, it must use all its available material on its ball teams, and it must train its weaker members in order to win. In the various contests that may well be held at the same time, nearly every child should compete in something. These contests are a great aid in developing enthusiasm and getting the children to practise. They are essential to the larger education of the country child, because the country children have no sportsmanship. They do not know what it is. They cheer their opponents' mistakes, try to annoy them in their play, call them names, dispute decisions, and the like. They do these things because they do not understand that these things are unsportsmanlike. Sportsmanship is essentially primitive ethics of the sort to which the boy is most subject and he cannot afford to miss the training.

Country children are diffident and backward on account of the lack of experience and acquaintanceship. Almost anything that takes them out of their own neighborhood to meet other children and compete with them will be valuable.

The rural school has no loyalty. The easiest way to develop it is always through contests with another school.

Play Festivals.—A considerable number of counties in several States are now holding play festivals every year. This is apt to be a large event and arouse much enthusiasm. It is one of the most hopeful means of setting the whole countryside to playing. The long races are to be avoided, and if basket-ball is played it should be for short halves. The first rural play festival in this country, so far as I know, was organized by President Scudder, of the New Paltz Normal School, in 1905. There are a number of normal schools that are now holding each year similar play festivals for the children of the counties in which they are placed. There are now some ninety

or more county secretaries of the Young Men's Christian Association, nearly all of whom are organizing athletics over at least a part of the county in which they are placed. There are probably a hundred or more county superintendents of schools that are organizing athletics and play festivals in their counties. There are no statistics, but in most large gatherings of teachers in whatever State they are held I meet one or more such superintendents. Probably the most salutary thing that could happen to the rural community would be to give the county superintendent an assistant who might organize the recreational facilities of the school and the community; or, in the face of the present social unrest in the country, perhaps it would be better to give the supervisor of recreation an assistant who should be superintendent of schools. The State and local supervisors of hygiene as suggested in former chapters will meet the need in an ideal way.

Perhaps the largest and most successful rural-play festival that is being held is the one that is organized by a special committee at Amenia, N. Y.

The School Excursion.—The school excursion is little known here, but it is very common abroad. In Germany these trips not infrequently cover a hundred miles or more, and last for a week or even three or four weeks, during the summer at times. The children walk from place to place and cook their meals by the wayside. They sleep in the barns, on the floors of inns, in the barracks of the soldiers, or in special schoolrooms transformed into dormitories for the purpose during the summer. They have a good time, hold athletic contests with children in other villages, and come to know the country and the people at first hand. They become so fond of these walking trips that they continue to walk for the rest of their lives.

It is essential that we should introduce these excursions into our schools, for various reasons. Walking is good exercise, and, if an enthusiasm for it is once acquired, it is likely to be continued during the remainder of the life. One of the serious

deficiencies of country life is that country people have never learned to love the country or to observe the nature world around them. As the German children are on the way the teacher points out to them the distant landscape, the beautiful sunset, or mountain view. They come to know and love the common birds and flowers. I am persuaded from my own experience that children will learn far more that they will remember on such trips than they will in any similar amount of time in school. Isolation is usually held to be the greatest drawback of the country, and walking, especially for girls and women, who often do not have a horse at command, is the most fundamental of all ways of overcoming isolation.

I should like to see Friday afternoons during the pleasant weather of the year devoted to these trips, and occasionally there should be a week-end camp of the girls with their woman teacher, or of the boys with their man teacher. There is no other similar opportunity to get a personal hold over children.

The Boy Scouts.—The Boy Scouts is a very recent order. Begun not more than ten years ago, it has already encircled the world and is found in every civilized country. The Boy Scouts of America was organized in January, 1910. But there are now more than three hundred thousand Scouts under some seven thousand Scout Masters in this country. The order is seeking to train into boys the hardihood and resourcefulness of the pioneer, to give a love of nature, and the arts of the woods and fields. It encourages walking and camping, athletics, chivalry, and courage.

Scouting appeals to the love of adventure and activity, which are fundamental to boy nature. The Scouts are offering to boys what they have always loved to read about and longed to do. The Scouts are now organized in nearly every small village in the United States, but the order has scarcely touched the country. Under existing circumstances the rural village is undoubtedly the best place for the organization of the order. It is not far from the village into the open country for walks and scouting. There is apt to be in the village some

one who may be Scout Master. The boys have plenty of time and they need the training. The boys on the farm do not need the order so much. They are in contact with nature already. They are getting some of the Scout experiences directly, and are learning to do some helpful kinds of work. But the great difficulty in the way of the organization of the Scouts in the country is the impossibility of securing Scout Masters. Scout Masters are not paid, and the country has not yet developed the spirit of social service. There are very few farmers who would feel like undertaking it even if they were paid. The only possibility of a general organization of the Scouts in the country seems to be to put them into the curriculum of the consolidated school. There they would be possible, and I believe well worth while.

The Camp Fire Girls.—The Camp Fire Girls is an order similar in every way to the Boy Scouts and of still more recent origin. It is also offering to girls just what they have always wanted to do, and it also requires the presence of an adult, the Guardian of the Camp Fire. Every encouragement is given to the girls to go on walks, to camp out, to learn folk-dances, to swim, etc. It appeals to the romance in girl nature much as scouting appeals to the love of adventure in the boy nature. The Camp Fire Girls have had a marvellous development all over the country, as they have deserved to have. The training which they are giving for the life of woman is far more fundamental than that of the school. The same limitations apply to the Girls as to the Boy Scouts. It is almost or quite impossible at present to find "Guardians of the Camp Fire" in most country sections. Hence the order is little organized there. The rural village is the best place for them, as all the conditions are there favorable. I believe that the Camp Fire Girls also richly deserve a portion of the school time. The Camp Fire Girls receive honors for swimming and athletics. They take long walks and camp out. They must sleep with their windows open, and learn to live the open-air life.

Saturday Half-Holiday in the Country.—During a large part of the year the one well-nigh impassable barrier to all social and recreational developments in the country is the lack of time. Farm people cannot work twelve and fourteen hours a day for six days a week and have left either the time or the energy with which to play. Since they are isolated in their work, it is far more important that farm people should have some time and place where they can get together than it is for city people to have a half-holiday or a social centre. Without the Saturday half-holiday it is going to be nearly or quite impossible to hold the boys and girls and the hired men on the farms. The half-holiday is essential to the welfare of the country both socially and intellectually. The work of the farm is mostly solitary. It furnishes abundant opportunities to think. Farmers as a class are apt to be dignified and substantial people, whose independence and self-respect have been among the chief assets of the republic. These qualities have been developed in the silent and thoughtful work of the fields. Such work has often been highly educational, but that can only be when the mind takes up from time to time new thoughts to be worked over in the fields, as the cow chews her cud in the evening. If the mind does not have new experiences to elaborate, this time in the fields is apt to be largely lost to culture.

Liberty H. Bailey says: "The Saturday half-holiday is coming in the country and coming fast." I have found it fairly common in parts of the Northwest, but there are many sections of the country where it is still almost unknown. If there may be tennis-grounds and ball-fields and a picnic-grove at the consolidated or township school, and the community may meet there on Saturday afternoons during six months of the year, it will do more to solve the problem of rural life than anything else that I know. Here the boys might play baseball or practise scouting. The girls might play volley-ball or croquet or tennis, or have their Camp Fire. The little children could play their games, and the parents could have their picnic

and social time. The teacher of agriculture might well give a lesson or demonstration to the adults at this time, or the farmers might drive to a neighboring farm where some interesting crop was being raised. I find that they are using the tree claims for these Saturday-afternoon picnics in parts of North Dakota.

The Social Centre.—A rapid development of rural social centres is now going on in Minnesota and Wisconsin. In other sections the movement is less prominent, but there are beginnings throughout the country. Undoubtedly the social centre is more needed in the country than it is in the city, because it is the country that most of all lacks social opportunity. The social centre, however, belongs more to the social and educational side of life than the physical in the country. It has far more to do with mental hygiene than it has to do with physical hygiene or physical training. However, many of the new township high schools and agricultural schools and consolidated schools have gymnasiums, and these are being used more or less in the evenings for basket-ball, volley-ball, and folk-dancing. There is an abundance of time for the older boys and girls to take part in these activities during the long winter evenings in the country, and it is to be hoped that a gymnasium will be a part of the equipment of all new consolidated schools as it already is of very many, and that it may be fully used by night as well as by day. If the principal of this consolidated school may now receive a small extra compensation as the director of the social centre and as Scout Master for the boys, almost anything is possible in the country community.

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